

User's Manual





MTPX Plus Series

Mini Twisted Pair Matrix Switcher

Precautions

Safety Instructions • English

- 


This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.
- 


This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

- Read Instructions** • Read and understand all safety and operating instructions before using the equipment.
- Retain Instructions** • The safety instructions should be kept for future reference.
- Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.
- Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

- 


Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).
- 


Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

- Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.
- Conservser les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.
- Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.
- Eviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

- 


Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.
- 


Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

- Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.
- Aufbewahren der Anleitungen** • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.
- Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.
- Keine Zusatzgeräte** • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

- 


Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.
- 


Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

- Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.
- Conservar las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.
- Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.
- Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

安全须知 • 中文

- 

这个符号提示用户该设备用户手册中有重要的操作和维护说明。
- 

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

- 阅读说明书** • 用户使用该设备前必须阅读并理解所有安全和使用说明。
- 保存说明书** • 用户应保存安全说明书以备将来使用。
- 遵守警告** • 用户应遵守产品和用户指南上的所有安全和操作说明。
- 避免追加** • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

Warning

- Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.
- Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).
- Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.
- Servicing** • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.
- Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.
- Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

- Alimentations** • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.
- Déconnexion de l'alimentation** • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.
- Protection du cordon d'alimentation** • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.
- Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.
- Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.
- Lithium Batterie** • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un ype équivalent recommandé par le constructeur. Mettre au reut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

- Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.
- Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.
- Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.
- Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.
- Schlitze und Öffnungen** • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.
- Litium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

- Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.
- Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.
- Protección del cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.
- Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.
- Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.
- Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

警告

- 电源** • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。
- 拔掉电源** • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。
- 电源线保护** • 妥善布线，避免被踩踏，或重物挤压。
- 维护** • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。
- 通风孔** • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。
- 锂电池** • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

Table of Contents

Chapter One • Introduction	1-1
About this Manual	1-2
About the MTPX Plus Twisted Pair Matrix Switchers	1-2
Twisted pair (TP) cable advantages	1-4
Transmission distances	1-4
Skew equalization	1-7
Definitions	1-7
Features	1-8
Chapter Two • Installation	2-1
Mounting the Switcher	2-2
UL guidelines	2-2
Mounting instructions	2-2
Rear Panel Cabling and Settings	2-3
Signal inputs	2-4
RS-232 output inserts	2-6
Signal outputs	2-6
RS-232/RS-422 connection	2-8
Ethernet connection	2-8
Cabling	2-9
RJ-45 connector wiring	2-9
Reset button	2-10
Power connection	2-10
Front Panel Configuration Port	2-11
Chapter Three • Operation	3-1
Front Panel Controls and Indicators	3-2
Input and output buttons	3-3
Control buttons	3-5
I/O controls	3-8
Button icons	3-9
Front Panel Operations	3-10
Definitions	3-10
Front panel security lockouts	3-11
Power	3-11
Creating a configuration	3-12
Example 1: Creating a set of video and audio ties	3-13
Example 2: Adding a tie to a set of video and audio ties	3-15
Example 3: Removing a tie from a set of video and audio ties	3-17
Viewing a configuration	3-19
Example 4: Viewing video and audio (RS-232), audio (RS-232) only, and video only ties	3-20
I/O grouping	3-23
Example 5: Grouping inputs and outputs	3-25

Table of Contents, cont'd

Using presets.....	3-28
Example 6: Saving a preset	3-29
Example 7: Recalling a preset	3-30
Muting and unmuting audio/RS-232 outputs.....	3-32
Example 8: Muting and unmuting an audio/RS-232 output.....	3-32
Viewing and adjusting the TP input audio level	3-34
Example 9: Viewing and adjusting an input audio level	3-35
Viewing and adjusting the local output volume.....	3-40
Reading the displayed volume	3-40
Example 10: Viewing and adjusting a local output volume level	3-43
Setting the front panel locks (<i>Executive modes</i>)	3-46
Selecting <i>Lock</i> mode 2 or toggling between mode 2 and mode 0	3-47
Selecting <i>Lock</i> mode 2 or toggling between mode 2 and mode 1	3-47
Performing a system reset from the front panel.....	3-48
Background illumination	3-48
Defining the audio/RS-232 wire pair.....	3-49
Selecting the rear panel Remote port protocol and baud rate	3-50
Rear Panel Operations	3-51
Performing a hard reset (reset 1)	3-53
Performing soft system resets (resets 3, 4, and 5)	3-54
Optimizing the Audio	3-55
Video Adjustments	3-55
Troubleshooting	3-55
Configuration Worksheets	3-56
Worksheet example 1: System equipment.....	3-56
Worksheet example 2: Daily configuration.....	3-57
Worksheet example 3: Test configuration	3-58
32-button switchers configuration worksheet	3-59
16-button switchers configuration worksheet	3-61
 Chapter Four • Programmer's Guide	 4-1
Serial Ports	4-2
Rear panel Remote port.....	4-2
Front panel Configuration port	4-3
Ethernet (LAN) Port	4-4
Ethernet connection	4-4
Default IP addresses.....	4-5
Establishing a connection	4-5
Connection timeouts	4-5
Number of connections.....	4-5
Using Verbose Mode.....	4-6
Host-to-Switcher Instructions	4-6
Switcher-Initiated Messages	4-6
Switcher Error Responses	4-7

Using the Command/Response Tables	4-8
Command/Response Table for SIS Commands	4-8
Symbol definitions	4-8
Command/response table for SIS commands.....	4-10
Command/Response Table for IP-specific SIS Commands	4-23
Symbol definitions	4-23
Command/response table for IP-specific SIS commands.....	4-25
Special Characters	4-26
 Chapter Five • Matrix Software	 5-1
Matrix Switchers Control Program	5-2
Installing the software	5-2
Software operation via Ethernet.....	5-3
Ethernet protocol settings	5-3
Using the Matrix Switcher Control software	5-4
IP Settings/Options window	5-6
Matrix IP Address field	5-7
Extron Name/Descriptor field	5-8
Gateway IP address field	5-8
Subnet Mask field.....	5-8
Hardware Address field.....	5-8
Use DHCP check box.....	5-9
Date, Time (local), and GMT (offset) fields	5-9
Sync Time to PC button	5-9
Use Daylight Savings check box.....	5-9
Mail Server IP Address field	5-10
Mail Server Domain Name field.....	5-10
E-mail Addressee fields	5-10
Updating firmware	5-12
Ethernet-connected firmware upload.....	5-14
Serial-port-connected firmware upload.....	5-15
Uploading HTML files.....	5-17
Windows buttons, drop boxes, and trashcan	5-18
Windows menus	5-18
File menu	5-18
Tools menu.....	5-19
Audio-input Configuration selection	5-21
Preferences menu	5-22
Master-Reset selection	5-23
Using <i>Emulation</i> mode	5-23
Using the help system	5-23
Optimizing the Video.....	5-24
MTP transmitter Pre-Peak selection	5-24
MTPX level/peaking setting.....	5-24
MTPX skew setting.....	5-25
MTPX Plus Pre-Peak selection.....	5-26
MTP Receiver level/peaking setting	5-26

Table of Contents, cont'd

Special Characters	5-27
Button-Label Generator Program	5-27
Using the Button-Label Generator software	5-28
 Chapter Six • HTML Operation	6-1
Download the Startup Page	6-2
System Status Page	6-3
System Settings Page	6-4
IP Settings fields	6-4
Unit Name field	6-4
DHCP radio buttons.....	6-4
IP Address field	6-5
Gateway IP Address field	6-5
Subnet Mask field.....	6-5
MAC Address field	6-5
Firmware field	6-5
Model field	6-5
Part Number field.....	6-5
Date/Time Settings fields	6-6
Passwords page	6-7
Email Settings page	6-8
Mail IP Address field.....	6-8
Setting up SMTP authorization	6-9
Domain Name field	6-9
Email address fields	6-9
Firmware Upgrade page	6-10
File Management Page	6-11
User Control Page	6-12
Creating a tie	6-13
Picture Settings page.....	6-13
Changing the input level/peaking.....	6-14
Toggling output pre-peaking on and off	6-14
Changing the skew.....	6-15
MTPX Configuration page.....	6-16
I/O Settings page.....	6-17
Changing the input gain and attenuation	6-18
Changing the output volume level	6-19
Muting and unmuting an audio or RS-232 output	6-19
Global Presets page	6-21
Saving a preset	6-21
Recalling a preset	6-21
Special Characters	6-22

Appendix A • Ethernet Connection	A-1
Ethernet Link	A-2
Ethernet connection	A-2
Default address	A-2
Pinging to determine the Extron IP address	A-3
Pinging to determine the Web IP address	A-3
Connecting as a Telnet client	A-3
Telnet tips	A-4
Open	A-4
Escape character and Esc key	A-4
Local echo	A-5
Set carriage return-line feed	A-5
Close	A-5
Help	A-5
Quit	A-5
Subnetting — A Primer	A-6
Gateways	A-6
Local and remote devices	A-6
IP addresses and octets	A-6
Subnet masks and octets	A-6
Determining whether devices are on the same subnet	A-7
Appendix B • Reference Information	B-1
Specifications	B-2
Part Numbers and Accessories	B-5
MTPX Plus matrix switcher part numbers	B-5
Included parts	B-5
Accessories	B-6
Cables	B-6
Connectors	B-7
Button Labels	B-8
Installing labels in the matrix switcher's buttons	B-8

Table of Contents, cont'd

68-1383-01 B
09 08

All trademarks mentioned in this manual are the properties of their respective owners.



MTPX Plus Twisted Pair Matrix Switchers

1 **Chapter One**

Introduction

About this Manual

About the MTPX Plus Twisted Pair Matrix Switchers

Definitions

Features

Introduction

About this Manual

This manual contains installation, configuration, and operating information for the Extron MTPX Plus Twisted Pair (TP) Matrix Switchers.

About the MTPX Plus Twisted Pair Matrix Switchers

The MTPX Plus matrix switcher distributes signals that are compatible with the Extron MTP and VTT/VTR product lines. The matrix switcher routes a TP input signal to any combination of TP outputs. Depending on the MTP model, the routed TP signal can include RGB or low resolution video and either mono audio or transmitter-to-receiver RS-232 serial communications. The matrix switcher can route multiple input/output configurations simultaneously.

NOTE *The receiver-to-transmitter serial communications and remote power capabilities available with certain MTP models are not supported by this matrix switcher.*

The matrix switcher is a single box solution to complex TP (figure 1-1) signal routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels.

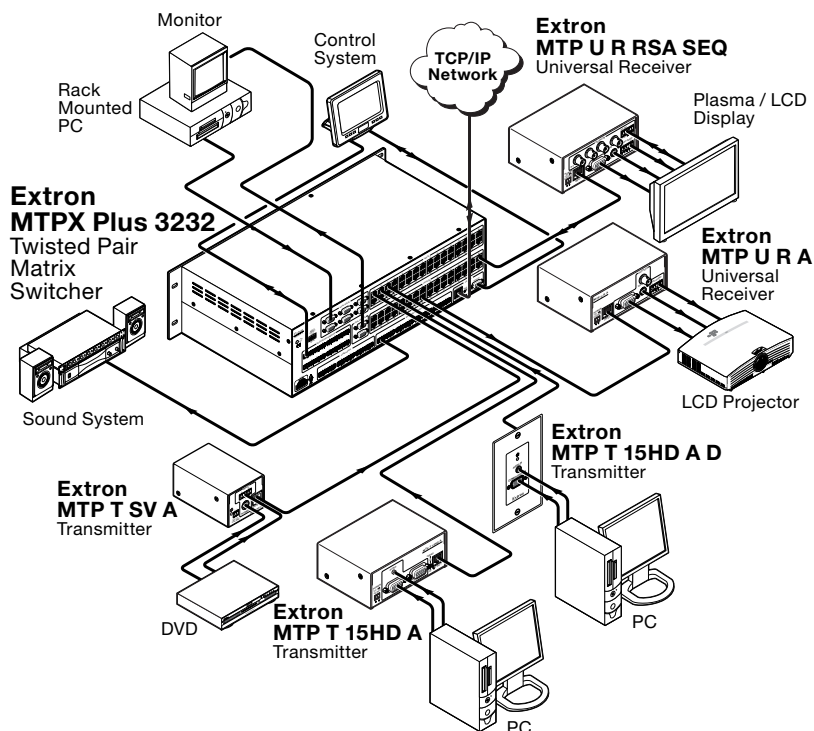


Figure 1-1 — Typical MTPX Plus Twisted Pair matrix switcher application

The MTPX Plus matrix switcher is available in a variety of matrix sizes (the matrix size is the number of inputs and outputs):

- MTPX Plus 816 (8 inputs by 16 outputs)
- MTPX Plus 168 (16 inputs by 8 outputs)
- MTPX Plus 1616 (16 inputs by 16 outputs)
- MTPX Plus 1632 (16 inputs by 32 outputs)
- MTPX Plus 3216 (32 inputs by 16 outputs)
- MTPX Plus 3232 (32 inputs by 32 outputs)

The MTPX Plus switchers input and output TP signals on RJ-45 connectors. A pre-peaking feature on selected outputs allows you to boost the transmission distance of the output TP signal.

NOTE *For best results, use a cable length of at least 50' (15 m) for all TP cables.*

Additionally, three or six (depending on the matrix size) 15-pin HD and 5-pole 3.5 mm direct insertion input connectors are available for direct RGB (VGA) and stereo audio inputs without an MTP transmitter. One or two (depending on the matrix size) 15-pin HD output connectors are available for direct RGB (VGA) output to a video device without an MTP receiver. Four or eight (depending on the matrix size) 5-pole 3.5 mm captive screw ports are available for direct mono audio outputs to an audio device without an MTP transmitter. The direct input and direct output 15-pin HD connectors can also support HD-YUV video, YUV video, S-video, and composite video.

When audio is part of the TP input signal, the audio switching can either be linked with the video (audio follow) or be independent of the video (audio breakaway). Adjustable input audio gain and attenuation compensates for level differences between audio inputs.

NOTE *For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.*

The matrix switcher can be remotely controlled via its rear panel RS-232/RS-422 Remote port and its front panel Configuration (RS-232) port using either Extron's Windows®-based Matrix Switchers Control Program or the Simple Instruction Set (SIS™). The SIS is a set of basic ASCII code commands that provide control through a control system or PC without programming long, obscure strings of code. SIS commands can be entered via either serial port.

The switcher can be operated remotely by any of the following when connected to either serial port:

- A control system
- A PC
- An Extron MKP 2000 remote control panel
- An Extron MKP 3000 remote control panel

Bidirectional RS-232 signals from a dedicated source (rather than from the selected input) can be directly inserted into the signal set routed to the TP output. You can even route RS-232 on a link that is normally audio, such as to an MTP U R 15HD RSA SEQ receiver, which can autodetect whether its signal input includes an audio component or an RS-232 component.

The matrix switcher is housed in a rack-mountable, 2U (MTPX Plus 1616 and smaller) or 3U (MTPX Plus 1632 and larger) high metal enclosure with mounting flanges for standard 19" racks. The appropriate rack mounting kit is included with each switcher.

The switcher has an internal 100 VAC to 240 VAC, 50/60 Hz, 30 watt power supply that provides worldwide power compatibility.

The MTPX Plus switcher has a minimum bandwidth of 300 MHz (-3 dB).

The switchers can also switch RGBS, RGsB, RsGsBs, HDTV, component video, S-video, and composite video.

Introduction, cont'd

Twisted pair (TP) cable advantages

Twisted pair cable is much smaller, lighter, more flexible, and less expensive than coaxial cable. These TP products make cable runs simpler and less cumbersome. Termination of the cable with RJ-45 connectors is simple, quick, and economical.

CAUTION *Do not connect this device to a computer data or telecommunications network.*

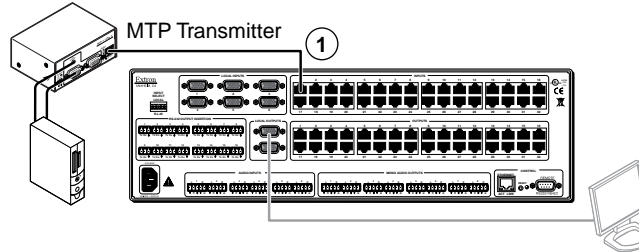
Transmission distances

The maximum distances are determined by the frequency and resolution of the video signal being routed and by which MTPX Plus inputs and outputs (TP or local) are in the full (video source to display) routing path. The tables below and on the next page specify the recommended maximum transmission distances using Extron Enhanced Skew-Free A/V UTP cable or UTP CAT 5, 5e, or 6 cable, terminated with RJ-45 connectors.

- NOTE**
- For both tables, the minimum TP cable length should be 50' (15 m).
 - RS-232 serial communications can be sent up to 1,000' (300 m) from the MTP transmitter output (or RS-232 output insert) to the MTP receiver TP input.
 - It is possible to exceed the recommended distances; however, image quality may be reduced.
 - For both tables, the MTPX output can be extended by 50' (15 m) for those outputs (MTP transmitter or MTPX) that have a Pre-Peak feature that is turned on.
 - The transmitters, receivers, and matrix switcher are designed for and perform best with Extron Enhanced Skew-Free A/V cable terminated in accordance with the TIA/EIA T 568 A wiring standard. CAT 5, 5e, and 6 cables are acceptable, but less preferable. We also recommend the use of preterminated and tested cables. Cables terminated on site should be tested before use to ensure that they comply with Category 5 specifications.
 - The recommendations shown in the tables apply equally for a transmission line consisting of a single transmitter, the switcher, and receiver and for a transmission line that encompasses a transmission daisy chain. For example, the maximum suggested output range (MTPX Plus TP output to MTP receiver) for 1024 x 768 video is 450' (135 m), whether the transmission line consists of the switcher and a single receiver or the switcher and three daisy-chained receivers. This range can be extended to 500' if the output is one that has the Pre-Peak function and the function is turned on.
 - For daisy-chained units, the first receiver in the chain should be at least 50' (15 m) from the switcher when the Pre-Peak feature is on.
 - For daisy-chained units, any receiver in the chain closer than 350' (105 m) may experience some form of over-peaking when the Pre-Peak switch is on. An overpeaked image may appear bloomed.

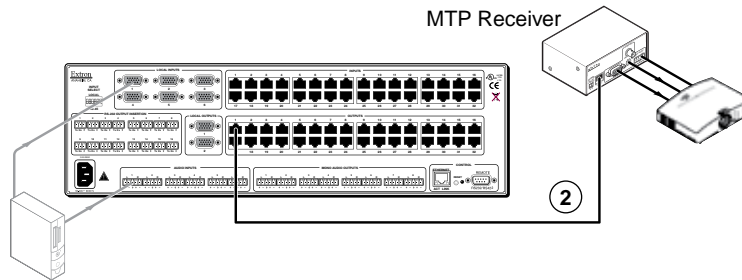
Recommended maximum TP transmission distances at 60 Hz, —

- ① **MTP transmitter to switcher when the display is on the MTPX Plus local (VGA) output**



— or —

- ② **Switcher to MTP receiver when the video source is on the MTPX Plus local (VGA) input**

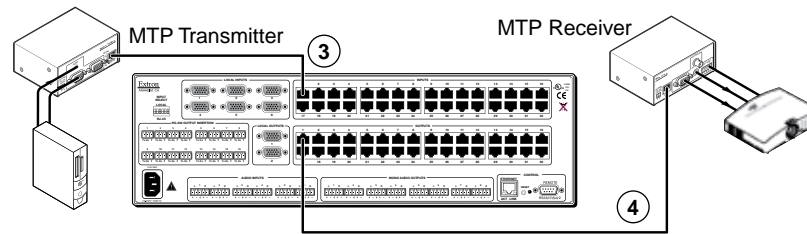


Video format	Sending unit Pre-Peak		Maximum distance	
	Off	On	High quality	Variable quality
Component, S-video, composite	<300' (90 m)	>350' (105 m)	800' (285 m)	1,000' (300 m)
640 x 480	<300' (90 m)	>350' (105 m)	700' (215 m)	750' (230 m)
800 x 600	<300' (90 m)	>350' (105 m)	550' (170 m)	650' (200 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	500' (150 m)	600' (185 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	400' (120 m)	500' (150 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)

NOTE Resolutions marked with an asterisk (*) in this table have the same range specifications at 75 Hz.

Introduction, cont'd

Recommended maximum TP transmission distances at 60 Hz, —
transmitter to receiver using MTPX TP inputs and outputs



Video format	MTPX Pre-Peak		Maximum distance			
	Off	On	High quality		Variable quality	
			MTPX input ③	MTPX output ④	MTPX input ③	MTPX output ④
Component, S-video	<300' (90 m)	>350' (105 m)	700' (215 m)	700' (215 m)	700' (215 m)	800' (245 m)
Composite	<300' (90 m)	>350' (105 m)	700' (215 m)	700' (215 m)	750' (230 m)	750' (230 m)
640 x 480	<300' (90 m)	>350' (105 m)	550' (170 m)	600' (185 m)	550' (170 m)	700' (215 m)
800 x 600	<300' (90 m)	>350' (105 m)	500' (150 m)	500' (150 m)	600' (185 m)	600' (185 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	450' (135 m)	450' (135 m)	550' (170 m)	550' (170 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	500' (150 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	300' (90 m)	400' (120 m)	400' (120 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	300' (90 m)	400' (120 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	300' (90 m)	450' (135 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	400' (120 m)	500' (150 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)

NOTE Resolutions marked with an asterisk (*) in this table have the same range specifications at 75 Hz.

Skew equalization

Skew exists between wire pairs when the physical length of one wire pair is different from another. Skew affects the displayed image when the differential length between wire pairs exceeds 2 feet, causing the timing of the red, green, and blue video signals to appear out of alignment (horizontal registration errors). The signals transmitted on the shortest pair are shifted to the left if you are viewing white lines on a black background. A white vertical line on a black field can appear as individual red, green, and blue lines that are close together; the signal transmitted on the shortest wire pair leads the other colors and appears to the left on the display. As the transmission cable length increases, the skew effect increases.

The MTPX Plus has a skew equalizer function that is available using SIS, the Windows-based control program, or built-in HTML page control. The skew function provides separate time delay circuits, on the red, green, and blue video lines on the inputs and the outputs. Each time delay circuit can be independently adjusted, from 0 to 62 nanoseconds, to properly align the red, green, and blue video signals on the displayed image. When correctly set, the red, green, or blue video signal on the shortest wire pair is delayed to properly converge the displayed video image.

UTP cable test equipment measures and reports wire pair length. The report on the various pair lengths can be used to properly equalize pair skew. If UTP cable test measurement cannot be done, pair skew can still be equalized by viewing a test pattern with a critical eye. Examine the test pattern for loss of horizontal registration and, through a process of trial and error, equalize any pair skew.

Definitions

The following terms, which apply to all Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection

Set of ties — An input **tied** to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more **ties** or one or more **sets of ties**

Current configuration — The **configuration** that is currently active in the switcher (also called “**configuration 0**”)

Global memory preset — A **configuration** that has been stored. Up to 32 **global memory presets** can be stored in memory. Preset locations are assigned to the input buttons and output buttons. When a **preset** is retrieved from memory, it becomes the **current configuration**.

All 32 global presets can be selected from the front panel for either saving or retrieving.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration**.

Features

Twisted pair inputs and outputs — The switchers input and output TP signals on female RJ-45 connectors.

NOTE *For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.*

Direct video inputs and outputs — The switchers directly input and output RGBHV or RGBS (VGA) video on 15-pin HD connectors. They can also input and output RGsB, RsGsBs, component/HDTV, S-video, or composite video.

Direct audio inputs — The switchers directly input balanced or unbalanced stereo audio on 3.5 mm, 5-pole captive screw terminals.

Audio input gain/attenuation — The volume of each audio signal that is input on the 5-pole, 3.5 mm direct insertion input connectors can be adjusted so there are no noticeable volume differences between sources. You can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the front panel or via serial port control.

Audio output volume — The volume of each audio signal that is output on the 5-pole, 3.5 mm direct insertion input connectors can be displayed and adjusted through a range of full output to complete silence, from the front panel or via serial port control.

Switching flexibility — The switcher provides individually buffered, independent, matrix switched outputs with audio follow and audio breakaway.

- **Tie any input to any or all outputs.**
- **Quick multiple tie** — Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.
- **Audio follow** — Audio can be switched with its corresponding video input via front panel control or via serial port remote control.
- **Audio breakaway** — Audio can be broken away from its corresponding video signal. This feature allows any audio signal to be tied to one or all outputs in any combination *with or without* an accompanying video signal. Audio breakaway switching can be done via front panel control or via serial port remote control.

Operational flexibility — Operations such as input/output selection, setting of presets, and adjustment of audio levels can be performed on the front panel or via either serial port. The serial ports allow remote control via a PC or a control system.

- **Front panel controls** — The front panel controls support input and output selection, preset creation and selection, audio gain and attenuation, and volume control. The front panel features slots for labels that can identify each input and output with text or graphics.
- **Windows-based control program** — For serial port remote control from a PC, the Extron Windows-based Matrix Switchers Control Program provides a graphical interface and drag-and-drop/point-and-click operation. The Windows-based control program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site.
- **Simple Instruction Set (SIS)** — The remote control protocol uses Extron's SIS for easy programming and operation.
- **Remote control panels and keypads** — The matrix switchers are remote controllable, using the optional MKP 2000 and MKP 3000 remote control keypads. These remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used for input-to-output switching or one-touch switching for a particular output. The MKP 3000 also can be used for selection of global presets.

Upgradeable firmware — The firmware that controls all switcher operations can be upgraded in the field via either serial port, without taking the switcher out of service. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and can be installed using the Windows-based control program.

Labeling — The Extron button label software is shipped with every Extron matrix switcher. You can create labels to place above the front panel input buttons and below the output buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother® P-Touch™ or comparable labeler.

Global memory presets — 32 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations, when needed, with a few simple steps on the front panel.

Rack mounting — The 2U high (matrix sizes 1616 and smaller) or 3U high (matrix sizes 1632 and larger) enclosure is rack mountable in any conventional 19" wide rack.

Three front panel security lockout modes (*Executive modes*) — If a matrix switcher is installed in an open area, where operation by unauthorized personnel may be a problem, either of two security lockout modes can be implemented (the third mode is unlocked). When a front panel lockout mode is enabled, a special button combination or SIS command is required to unlock the front panel controls and make the front panel fully operational.

Power — The matrix switcher's 100 VAC to 240 VAC internal power supply provides worldwide power compatibility.

Introduction, cont'd



MTPX Plus Twisted Pair Matrix Switchers

Chapter Two

Installation

Mounting the Switcher

Rear Panel Cabling and Settings

Front Panel Configuration Port

Installation

Mounting the Switcher

UL guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the MTPX Plus into a rack.

1. **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the MTPX Plus in an environment compatible with the maximum ambient temperature ($T_{ma} = +122\text{ }^{\circ}\text{F}$, $+50\text{ }^{\circ}\text{C}$) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Mounting instructions

The MTPX Plus switchers are housed in a rack-mountable, 2U high (matrix sizes 1616 and smaller) or 3U high (matrix sizes 1632 and larger) metal enclosures with mounting flanges for standard 19" racks. If desired, rack mount the unit as follows:

1. Insert the switcher into the rack, aligning the holes in the mounting ears with those in the rack (figure 2-1).
2. Secure the switcher to the rack using the supplied bolts.

NOTE Extron recommends that you allow 1U of rack space above and below the switcher for ventilation.

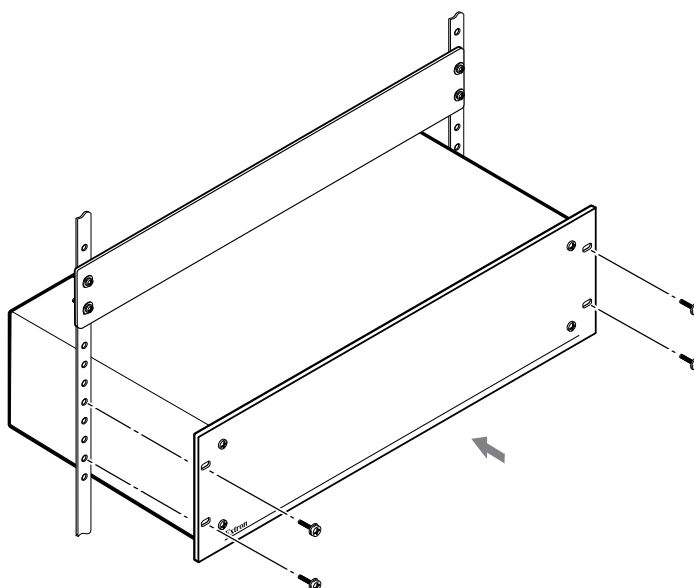


Figure 2-1 — Installing the switcher in a rack

Rear Panel Cabling and Settings

Figure 2-2 shows the rear panel of the MTPX Plus 1616.

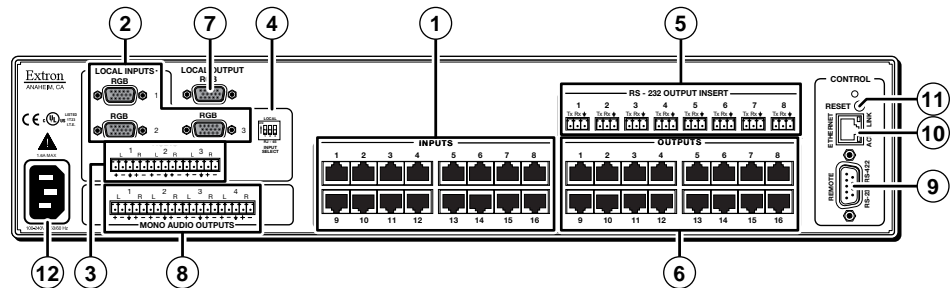


Figure 2-2 — MTPX Plus 1616 twisted pair matrix switcher

NOTE The MTPX Plus 816 and MTPX Plus 168 are housed in the same 2U enclosure, but have fewer input and/or output connectors to accommodate their smaller matrix sizes.

Figure 2-3 shows the rear panel of the MTPX Plus 3232.

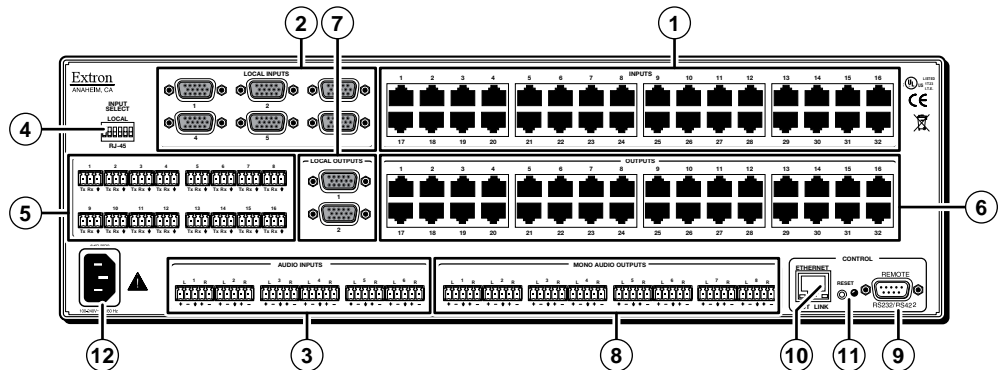


Figure 2-3 — MTPX Plus 3232 twisted pair matrix switcher

NOTE The MTPX Plus 1632 and MTPX Plus 3216 are housed in the same 3U enclosure, but have fewer input and/or output connectors to accommodate their smaller matrix sizes.

CAUTION Use Electrostatic discharge (ESD) precautions (be electrically grounded) when making connections. Electrostatic discharge can damage equipment, even if you cannot feel, see, or hear it.

CAUTION Remove system power before making any connections.

Installation, cont'd

Signal inputs

- ① **Inputs (TP) connectors** — Connect the TP outputs of compatible MTP or VTT transmitters to these RJ-45 female connectors.

CAUTION Do not connect this device to a computer data or telecommunications network.

- NOTE**
- You must configure the switcher for the appropriate content on the audio/RS-232 wire pair (pins 3 and 6) for each TP input. See “Defining the audio/RS-232 wire pair” in chapter 3, “Operation”. You can also use SIS commands (chapter 4, “Programmer’s Guide”) or the Windows-based control program (chapter 5, “Matrix Software”).
 - For best results, use a combined cable length of at least 50’ (15 m) between the transmitter and the receiver on the MTPX output.
 - RJ-45 termination with CAT 5, CAT 5e, or CAT 6 cable must comply with the TIA/EIA T568A or TIA/EIA T568B wiring standards for all connections. RJ-45 termination with Enhanced Skew-Free A/V UTP cable must comply with TIA/EIA T568A only.
 - For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.

Figure 2-4 shows the recommended termination of TP cables in accordance with the TIA/EIA T568A or TIA/EIA T568B wiring standards. You can use either standard with CAT 5, 5e, or 6 cable, but use the same standard on both ends of the cable.

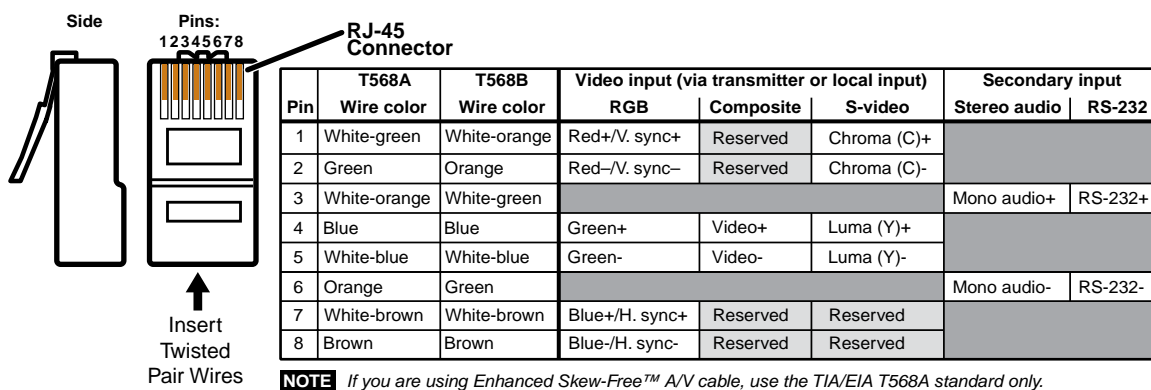


Figure 2-4 — TP cable termination

NOTE Enhanced Skew-free A/V cable is not recommended for Ethernet/LAN applications. This cable is specially designed for compatibility with Extron’s Twisted Pair products that are wired using the TIA/EIA 568 A standard.

The green, brown, and blue pairs of this cable have virtually identical lengths and should be used to transmit the RGB signals.

The orange pair of this cable has a different length and **should not** be used to transmit the RGB signals.

- ② **Local Inputs (VGA) connectors** — Connect analog computer-video (RGB) sources to these 15-pin HD female connectors.



- NOTE**
- The video that is input on this connector is converted to the proprietary TP signal output by the MTP 15HD transmitters, allowing you to eliminate some of the transmitters in your system.
 - Extron recommends **against** tying a local (VGA) input to a local (VGA) output; the image displayed from such a tie may be overpeaked.
 - When either the input or output of a tie is local (VGA), Extron recommends that the MTP output or input be connected by a minimum of 50' (15 m) of TP cable to prevent overpeaking.
 - The matrix switchers can also input and switch HD component video, component video, S-video, or composite video by using the appropriate adapters. No configuration of the switcher is required for component or other non-RGB video formats.

- ③ **Audio Inputs (local audio) connectors** — Connect balanced or unbalanced stereo audio inputs to these 3.5 mm, 5-pole captive screw connectors. Connectors are included with each switcher, but you must supply the audio cable. See figure 2-5 to wire a connector for the appropriate input type and impedance level. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector. High impedance is generally over 800 ohms.

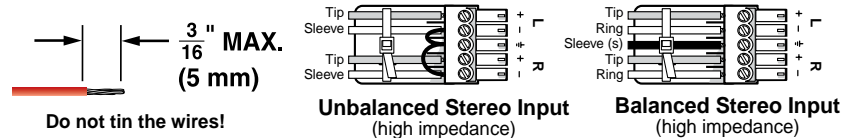
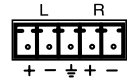


Figure 2-5 — Captive screw connector wiring for audio inputs

CAUTION The length of the exposed (stripped) portion of the copper wires is important. The ideal length is 3/16" (5 mm). Longer bare wires can short together. Shorter bare wires are not as secure in the captive screw connectors and could be pulled out.

CAUTION The captive screw audio connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio output circuits. Ensure that the connector is plugged fully and only into the desired input or output.

NOTE See figure 2-6 to identify the tip, ring, and sleeve parts of the connector when you are making connections for the switcher from existing audio cables. A mono audio connector consists of a tip and sleeve. A stereo audio connector consists of a tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 2-5 and figure 2-8.

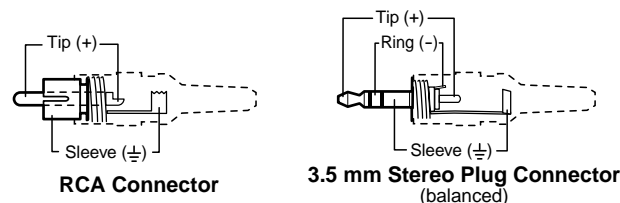
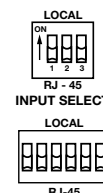


Figure 2-6 — Typical audio connectors

Installation, cont'd

The audio level for each local input can be individually set via the front panel or serial port control to ensure that the level on the output does not vary from input to input. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation", for details.

- ④ **Input Select switches** — For inputs 1 through 3 (matrix sizes 1616 and smaller) or inputs 1 through 6 (matrix sizes 1632 and larger), set these DIP switches to the Local (up) position to select the local (RGB video and audio) input. Set the DIP switches to the RJ-45 (down) position to select the MTP input.



RS-232 output inserts

- ⑤ **RS-232 Output Insert connectors** — For bidirectional RS-232 data that is routed to a specific (unswitchable) TP output, connect a serial device to one of these 3.5 mm, 3-pole captive screw connectors. Figure 2-7 shows how to wire the connectors.

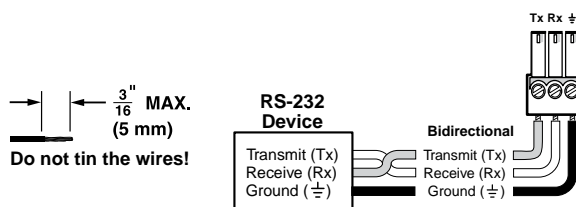


Figure 2-7 — RS-232 output insert wiring

- NOTE**
- For the RS-232 Output Insert to be available on the TP output, the insert must be enabled via an SIS command, the Windows-based control program, or an MTPX Plus HTML page. See chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation" for details.
 - When an RS-232 output insert is enabled, any content on the audio/RS-232 wire pair for the TP input tied to that output is disabled.
 - Each RS-232 output insertion is dedicated to the output with that number; for example, RS-232 Output Insert 1 is always routed to the Output 1 TP connector (when enabled as described in the note above), RS-232 Output Insert 2 is routed to the Output 2 TP connector, and so on.
 - The switch time for the RS-232 output insert is 50 ms.

Signal outputs

- ⑥ **Outputs (MTP) connectors** — Connect the TP inputs of compatible MTP or VTT receivers to these RJ-45 female connectors.

CAUTION Do not connect this device to a computer data or telecommunications network

NOTE See the Inputs connector, item ③, in the "Signal inputs" section, for detailed pin assignments for the RJ-45 connectors.

NOTE For best results, use a cable length of at least 50' (15 m) between the TP output connector and the receiver.

- ⑦ **Local Outputs (VGA) connector(s)** — Connect one or two RGBHV video displays to these 15-pin HD female connectors for each output.

NOTE

- Matrix sizes 1616 and smaller have one local video output. Matrix sizes 1632 and larger have two local video outputs.
- These outputs are always outputs 1 and 2, with the same inputs tied to them as to TP outputs 1 and 2.
- The video that is output on this (these) connector(s) is converted from the tied proprietary TP input signal or the local (VGA) input. This feature allows you duplicates of output(s) 1 (and 2) while eliminating the need for extra receivers.
- Extron recommends **against** tying a local (VGA) input to a local (VGA) output; the image displayed from such a tie may be overpeaked.
- When either the output or input of a tie is local (VGA), Extron recommends that the MTP input or output be connected by a minimum of 50' (15 m) of TP cable to prevent overpeaking.
- This connector can also output HD component video, component video, S-video, or composite video if that is the video format that was input.

If the video output is NTSC component video, S-video, or composite video, set the output to turn off sync stripping. See the Local video output sync polarity SIS commands on page 4-13.

- ⑧ **Mono Audio (local audio) outputs** — Connect audio devices, such as an audio amplifier or powered speakers, to these four or eight 3.5 mm, 5-pole captive screw connectors. These connectors output the selected unamplified, mono line level audio. See figure 2-8 to wire an output connector. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

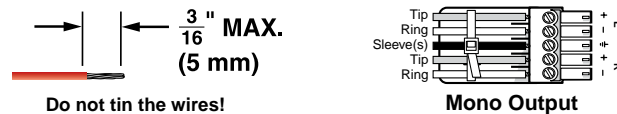


Figure 2-8 — Captive screw connector wiring for audio output

CAUTION

Connect the sleeve to ground (Gnd). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.

CAUTION

The length of the exposed (stripped) portion of the copper wires is important. The ideal length is 3/16" (5 mm). Longer bare wires can short together. Shorter bare wires are not as secure in the direct insertion connectors and could be pulled out.

NOTE

- Matrix sizes 1616 and smaller have four local audio outputs. Matrix sizes 1632 and larger have eight local audio outputs.
- These outputs are always outputs 1 through 4 (or 8), with the same inputs tied to them as to TP outputs 1 through 4 (or 8).
- The audio that is output on this (these) connector(s) is converted from the tied proprietary TP input signal or the local audio input. This feature allows you duplicates of the outputs while eliminating the need for extra receivers.
- When an input that is configured as RS-232 is switched to a local audio output, the output is muted to prevent RS-232 noise on the audio output.

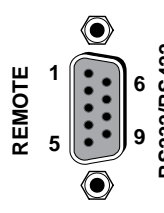
The volume level for each local output can be individually set via the front panel or serial port control. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation", for details.

Installation, cont'd

By default, the audio ties follow the video ties. Audio breakaway, which can be activated via the front panel or under serial port or Ethernet control, allows you to select from any one of the audio input sources and route it separately from its corresponding video source. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation", for details.

RS-232/RS-422 connection

- ⑨ **Remote RS-232/RS-422 connector** — Connect a host device, such as a computer, touch panel control, or RS-232 capable PDA to the switcher via this 9-pin D connector for serial RS-232/RS-422 control (figure 2-9).



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX-	Transmit data (-)
3	RX	Receive data	RX-	Receive data (-)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Figure 2-9 — Remote RS-232/RS-422 connector

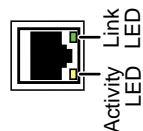
See chapter 4, "Programmer's Guide", for definitions of the SIS commands (serial commands to control the switcher via this connector) and chapter 5, "Matrix Software", for details on how to install and use the control software.

NOTE The switcher can support either the RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, or 115200 baud rates. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-50, to configure the RS-232/RS-422 port from the front panel.

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the switcher's RS-232/RS-422 connector. Refer to the *MKP 2000 Remote Control Panel User's Manual* or the *MKP 3000 User's Manual* for details.

Ethernet connection

- ⑩ **LAN port** — If desired, for IP control of the matrix switcher, connect the switcher to a PC or to an Ethernet LAN via this RJ-45 connector. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is running Extron's Windows-based control program or has downloaded HTML pages from the switcher.



Ethernet connection indicators — The Link and Activity LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily. The Activity LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling

It is vital that your Ethernet cables be the correct cable type, and that they be properly terminated with the correct pinout. Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328' (100 m).

NOTE *Do not use standard telephone cables. Telephone cables do not support Ethernet or Fast Ethernet.*

Do not stretch or bend cables. Transmission errors can occur.

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

RJ-45 connector wiring

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 2-10).

- **Crossover cable** — Direct connection between the computer and the MTPX Plus switcher
- **Patch (straight) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN

Installation, cont'd

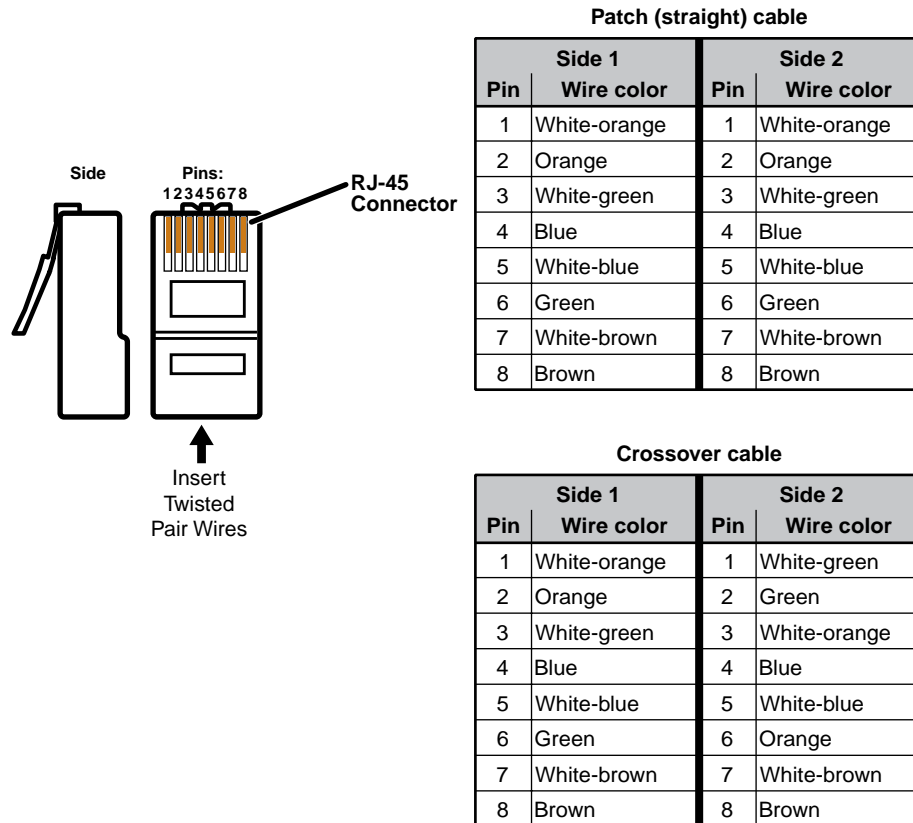



Figure 2-10 — RJ-45 connector and pinout tables

Reset button

- ⑪ **Reset button** — The Reset button initiates two levels of reset to the matrix switcher. For two different reset levels, press and hold the button while the switcher is running or while you power up the switcher. 

See "Rear Panel Operations" in chapter 3, "Operation", for details.

- **Rear panel (mode 5) system reset** — Press and hold the Reset button until the Reset LED blinks three times (approximately 9 seconds), then release the button and push it again. This reset clears all ties and presets and resets all audio gains to 0 dB.
- **Hard reset** — Press and hold the Reset button while powering up the switcher to perform all of the mode 5 reset functions and restore the switcher to the default factory conditions.

NOTE *Hard reset does not clear the current configuration.*

Power connection

- ⑫ **AC power connector** — Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

WARNING *The power connector is wired double pole with neutral fusing.*

Front Panel Configuration Port

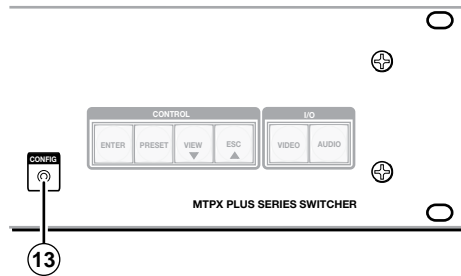


Figure 2-11 — Front panel configuration port

- 13 Configuration port** — This 2.5 mm mini stereo jack serves the same serial communications function as the rear panel Remote port, but it is easier to access than the rear port after the matrix switcher has been installed and cabled. The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part #70-335-01 (figure 2-12), can be used for this connection.

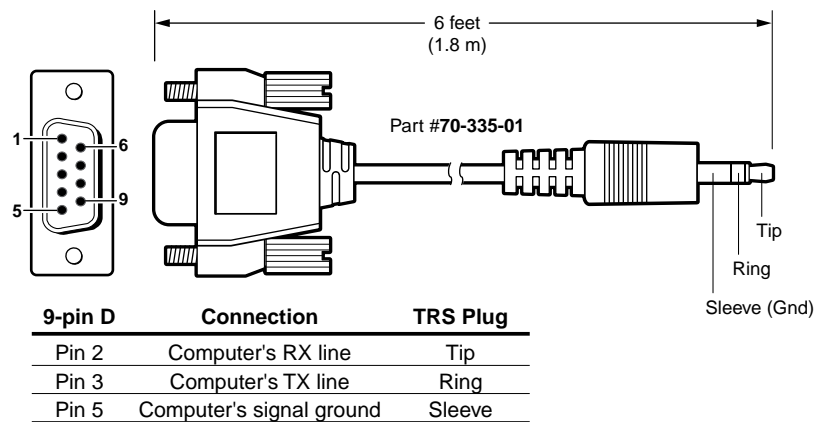


Figure 2-12 — Optional 9-pin TRS RS-232 cable

NOTE This port is independent of the rear panel Remote port and is not affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed, under SIS command control only. See the Command/Response table for IP SIS commands, in chapter 4, "Programmer's Guide", to configure all ports under SIS control.

NOTE A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.

This port is RS-232 only, with its default protocols as follows:

- 9600 baud
- 1 stop bit
- no parity
- no flow control
- 8 data bits

NOTE The maximum distances from the matrix switcher to the controlling device can vary up to 200' (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50' (15 m) are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250' (76 m) away.

Installation, cont'd



MTPX Plus Twisted Pair Matrix Switchers

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Rear Panel Operations

Optimizing the Audio

Video Adjustments

Troubleshooting

Configuration Worksheets

Operation

Front Panel Controls and Indicators

The front panel controls (figure 3-1 and figure 3-2) are grouped into two sets. The input and output buttons, ① and ②, are grouped on the left side of the control panel. The control buttons and video/audio (I/O) selection buttons, ③ and ⑧, are grouped on the right side of the panel.

NOTE While the number of inputs and outputs varies depending on the size of the matrix, there are only two front panel arrangements: 16 input buttons by 16 output buttons (figure 3-1) and 32 by 32 (figure 3-2).

NOTE On smaller matrix switchers, the larger-numbered buttons are not used for input and output selection, although they are used to select and indicate preset numbers, indicate the input audio level, and indicate the output audio volume.

The large, illuminated pushbuttons can be labeled with text and/or graphics. The buttons can be set to provide amber background illumination all the time, or the background illumination can be turned off (see “Background illumination”, on page 3-48). The buttons blink or are lit at full intensity (depending on the operation) when selected.

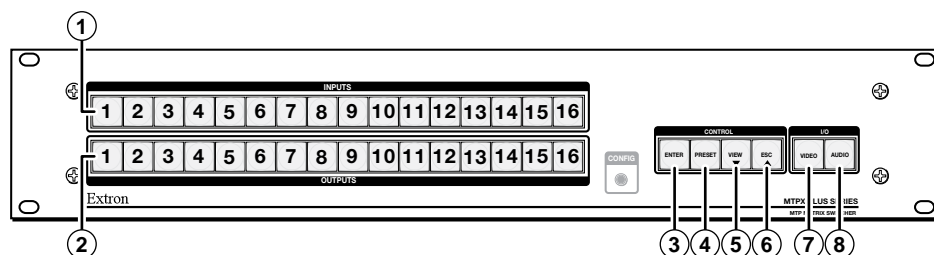


Figure 3-1 — Front panel, MTPX Plus 1616

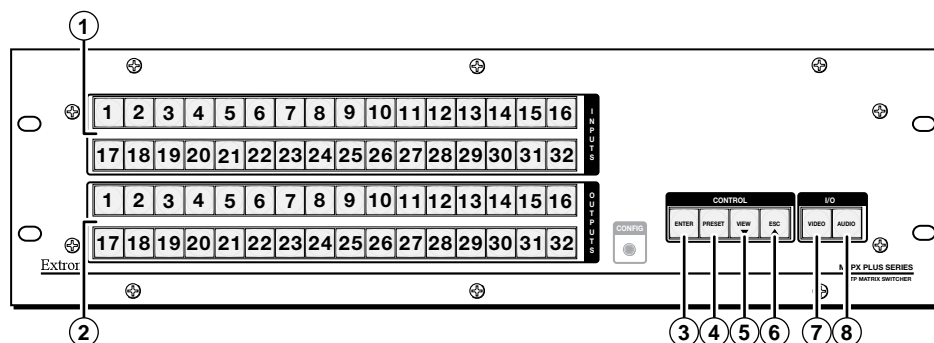







Figure 3-2 — Front panel, MTPX Plus 3232

- ① Input buttons — See page 3-4.
- ② Output buttons — See page 3-4.
- ③ Enter button — See page 3-5.
- ④ Preset button — See page 3-6.
- ⑤ View button — See page 3-6.
- ⑥ Esc button — See page 3-7.
- ⑦ Video button — See page 3-8.
- ⑧ Audio button — See page 3-9.





Input and output buttons

Primary functions								
	Action:	Select input or output for tie being created.						
	Indications:	<i>Blink:</i> potential tie/untie <i>Lit:</i> current tie <i>Amber:</i> video and audio tie <i>Green:</i> video only tie <i>Red:</i> audio only tie						
					through		or	
Secondary functions								
I/O Grouping	Action 1:	Input 1 and Output 1: Select I/O Group mode.						
	Action 2/ indication:	Assign an input or output to the selected group. <i>Lit:</i> Input or output is assigned to the selected group.						
Presets	Action/ indication:	Select a preset in <i>Preset</i> mode. <i>Lit:</i> A preset has already been saved to this location. <i>Blink:</i> Preset location is selected to be saved.						
Input audio level	Action/ indication: (inputs)	<i>Inputs:</i> Select the input's audio for gain or attenuation adjustment. <i>Lit:</i> Input's audio is selected for adjustment.						
	Indication (outputs)	Indicate the input gain or attenuation level.						
Output audio volume	Action/ indication: (outputs)	<i>Outputs:</i> Select the output's audio for volume adjustment. <i>Lit:</i> Output's audio is selected for adjustment.						
	Indication (inputs)	Indicate the output volume level.						
Audio/RS-232 mutes	Action/ indication:	<i>Outputs:</i> Press and hold to mute the audio or RS-232 output. <i>Outputs, blink:</i> Output audio or RS-232 is muted.						
Input configuration	Action/ indications:	Toggle between RS-232 or audio as the pins 3 and 6 input. <i>Lit:</i> RS-232 <i>Unlit:</i> audio						
Background illumination	Action:	Toggle between background illumination or buttons unlit.						

NOTE *If the switcher has fewer inputs or outputs than input or output buttons, only the buttons for which the switcher has an input or output select and identify that input or output.*

- ① **Input buttons** — The input buttons have two primary functions (•) and six secondary functions (□):
 - Select an input.
 - Identify the selected input.
 - **(Input 1 only)** With the Output 1 button, select *I/O Group* mode. See “I/O grouping” on page 3-23.
 - Assign an input to the selected group in *I/O Group* mode and indicate its assignment. See “I/O grouping” on page 3-23.
 - Select a preset. See “Using presets” on page 3-28.
 - Display the output volume level. See “Viewing and adjusting the local output volume” on page 3-40.
 - Select and identify the audio/RS-232 wire pair as audio (unlit) or RS-232 (lit) in *Serial Port and Audio/RS-232 Input Configuration* mode. See “Defining the audio/RS-232 wire pair” on page 3-49.
 - (Input 1 and Input 2 only) Toggle background illumination of the buttons on and off. See “Background illumination” on page 3-48.
- ② **Output buttons** — The output buttons have two primary functions (•) and five secondary functions (□):
 - Select output(s).
 - Identify the selected output(s).
 - **(Output 1 only)** With the Input 1 button, select *I/O Group* mode. See “I/O grouping” on page 3-23.
 - Assign an output to the selected group in *I/O Group* mode and indicate its assignment. See “I/O grouping” on page 3-23.
 - Select a preset. See “Using presets” on page 3-28.
 - Mute the audio or RS-232 output. See “Muting and unmuting audio/RS-232 outputs” on page 3-32.
 - Display the audio level of the selected input. See “Viewing and adjusting the TP input audio level” on page 3-34.

Control buttons

Primary functions					
Action:		Save changes	Select <i>Preset</i> mode	Select <i>View</i> mode	Cancel/escape
Indication:		<i>Blink:</i> save needed	<i>Blink:</i> Save preset <i>Lit:</i> Recall preset	<i>View</i> mode selected	Flashes once
					
Secondary functions					
I/O Grouping	Action/indication:	Select group 1.	Select group 2.	Select group 3.	Select group 4.
Port and input configuration	Action 1:	Select <i>Configuration</i> mode			
	Action 2/indication:	Select 9600 baud. <i>Blink:</i> selected	Select 19200 baud. <i>Blink:</i> selected	Select 38400 baud. <i>Blink:</i> selected	Select 115200 baud. <i>Blink:</i> selected
Front panel locks	Action:	With Video and Audio, select <i>Lock</i> mode 2 and/or toggle between mode 0 and mode 2.			
Audio	Action:			In <i>Audio</i> mode, decrease input level or output volume.	In <i>Audio</i> mode, increase input level or output volume.

- ③ **Enter button** — The Enter button has two primary functions (•) and four secondary functions (□):
- Saves configuration or preset changes that you make on the front panel. To create a simple configuration:
 - Specify video, audio, or both (see I/O selection buttons [⑦] and [⑧]).
 - Press the desired input button (①).
 - Press the desired output button(s) (②).
 - Press the Enter button.
 - Indicates that a potential tie has been created but not saved.
 - In the *I/O Group* mode, selects group 1 and indicate the selection. See “I/O grouping” on page 3-23.
 - With the Preset, View, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50 and “Defining the audio/RS-232 wire pair” on page 3-49.
 - Selects 9600 baud for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.
 - With the Video and Audio buttons, selects front panel security *Lock* mode 2 or toggles between mode 0 (unlocked) and mode 2. See “Setting the front panel locks (*Executive* modes)” on page 3-46.

- ④ **Preset button** — The Preset button has two primary functions (•) and three secondary functions (□):
- Activates *Save Preset* mode to save a configuration as a preset and *Recall Preset* mode to activate a previously-defined preset.
 - Blinks when *Save Preset* mode is active and lights steadily when *Recall Preset* mode is active.
 - In the *I/O Group* mode, selects group 2 and indicates the selection. See “I/O grouping” on page 3-23.
 - With the Enter, View, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50 and “Defining the audio/RS-232 wire pair” on page 3-49.
 - Selects 19200 baud for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.
- ⑤ **View (▼) button** — The View (▼) button has two primary functions (•) and five secondary functions (□):
- Selects *View-only* mode that displays the current configuration.
- NOTE** *View-only mode also provides a way to mute and unmute the audio or RS-232 outputs. See “Muting and unmuting audio/RS-232 outputs” on page 3-32.*
- Indicates that *View-only* mode is active.
 - In the *I/O Group* mode, selects group 3 and indicates the selection. See “I/O grouping” on page 3-23.
 - Decreases the audio level of the selected input. See “Viewing and adjusting the TP input audio level” on page 3-34.
 - Decreases the volume of the selected output. See “Viewing and adjusting the local output volume” on page 3-40.
 - With the Enter, Preset, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50 and “Defining the audio/RS-232 wire pair” on page 3-49.
 - Selects 38400 baud for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode, and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.



⑥ **Esc (▲) button** — The Esc (▲) button has two primary functions (●) and five secondary functions (□):

- Cancels operations or selections in progress and resets the front panel button indicators.

NOTE *The Esc (▲) button does **not** reset the current configuration, the Video button and Audio selection button, any presets, or any audio gain or attenuation or volume settings.*

- Flashes once to indicate that the escape function has been activated.
- In the *I/O Group* mode, selects group 4 and indicates the selection. See “I/O grouping” on page 3-23.
- Increases the audio level of the selected input. See “Viewing and adjusting the TP input audio level” on page 3-34.
- Increases the volume of the selected output. See “Viewing and adjusting the local output volume” on page 3-40.
- With the Enter, Preset, and View buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50 and “Defining the audio/RS-232 wire pair” on page 3-49.
- Selects 115200 baud for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.

I/O controls

Primary functions			
Action/ indication:		Select video. Green when selected	Select audio. Red when selected
			
Secondary functions			
Front panel locks	Action 1:	With Enter, select <i>Lock</i> mode 2 and/or toggle between mode 0 and mode 2.	
	Action 2:	Select <i>Lock</i> mode 1 and/or toggle between mode 2 and mode 1.	
Resets	Action:	Perform a system reset	
Port configuration	Action/ indication:	Select RS-232. <i>Blink</i> : selected	Select RS-422. <i>Blink</i> : selected
Audio	Action/ indication:		Select <i>Audio</i> mode. Blinks red.

- ⑦ **Video button** — The Video button has two primary functions (•) and four secondary functions (□):
- Selects and deselects video for a configuration that is being created or viewed.
 - Lights green to indicate that video is available for configuring or for viewing.
 - With the Enter button and Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0). See “Setting the front panel locks (*Executive* modes)” on page 3-46.
 - With the Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 1). See “Setting the front panel locks (*Executive* modes)” on page 3-46.
 - With the Audio button, commands the front panel system reset. See “Performing a system reset from the front panel” on page 3-48.
 - Selects the RS-232 protocol for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.

- ⑧ **Audio button** — The Audio button has two primary functions (•) and five secondary functions (□):
- Selects and deselects audio (or RS-232 if the audio/RS-232 wire pair is set for RS-232) for a configuration that is being created or viewed.
 - Lights to indicate that audio is available for configuration or viewing.
 - Selects the *Audio* mode, in which you can adjust the input audio level and the output audio volume. See “Viewing and adjusting the TP input audio level” on page 3-34 and “Viewing and adjusting the local output volume” on page 3-40.
 - With the Enter button and Video button, selects between front panel locks (*Lock mode 2* and *Lock mode 0*). See “Setting the front panel locks (*Executive modes*)” on page 3-46.
 - With the Video button, selects between front panel locks (*Lock mode 2* and *Lock mode 1*). See “Setting the front panel locks (*Executive modes*)” on page 3-46.
 - With the Video button, commands the front panel system reset. See “Performing a system reset from the front panel” on page 3-48.
 - Selects the RS-422 protocol for the rear panel RS-232/RS-422 port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection. See “Selecting the rear panel Remote port protocol and baud rate” on page 3-50.

Button icons

The numbered translucent covers on the input and output pushbuttons can be removed and replaced to insert labels behind the covers.

Input and output labels can be created easily with Extron’s Button-Label Generator software, which is shipped with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or . color bitmaps for easy and intuitive input and output selection (figure 3-3). See chapter 5, “Matrix Software”, for details on using the labeling software. See appendix B, “Reference Information”, for blank labels and a procedure for removing and replacing the translucent covers.

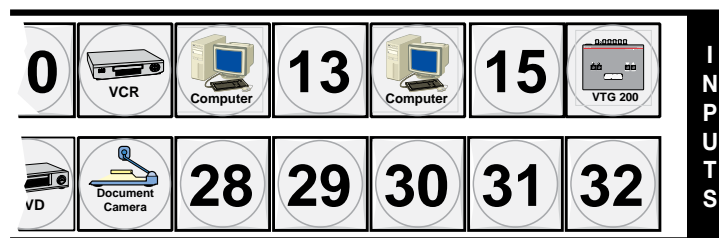


Figure 3-3 — Sample button icons

Front Panel Operations

The following sections detail the power-up process and then provide sample procedures for the following actions:

- Creating ties, sets of ties, and configurations
- Changing a configuration
- Viewing ties, sets of ties, and configurations
- Creating I/O groups
- Saving a preset
- Recalling a preset
- Muting and unmuting outputs
- Viewing and adjusting the TP input audio level
- Viewing and adjusting the local output volume
- Locking and unlocking the front panel
- Performing front panel resets
- Toggling background illumination on and off
- Defining the audio/RS-232 wire pair
- Reading and setting the RS-232/RS-422 Remote port settings

Definitions

The following terms, which apply to all Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection

Set of ties — An input **tied** to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more **ties** or one or more **sets of ties**

Current configuration — The **configuration** that is currently active in the switcher (also called **configuration 0**)

Global memory preset — A **configuration** that has been stored. Up to 32 **global memory presets** can be stored in memory. Preset locations are assigned to the input buttons and output buttons. When a **preset** is retrieved from memory, it becomes the **current configuration**.

All 32 global presets can be selected from the front panel for either saving or retrieving.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration**.

Front panel security lockouts

In the procedural descriptions that follow, it is assumed that the switcher is in *Lock mode 0* (fully unlocked). The following two *Lock* modes are also available:

- *Lock mode 1* — All changes are locked from the front panel (except for setting *Lock mode 2*). Some functions can be viewed.
- *Lock mode 2* — Advanced features are locked and can be viewed only. Basic functions are unlocked.

NOTE *The switcher is shipped from the factory in Lock mode 2.*

See “Setting the front panel locks (*Executive modes*)” on page 3-46 for a detailed list of basic and advanced functions and the procedure to set the various front panel locks.

Power

Apply power by connecting the power cord between the switcher and an AC source. The switcher performs a self-test that flashes the front panel button indicators red, green, and amber and then turns them off. An error-free power-up self-test sequence leaves all input, output, and control buttons either unlit or showing background illumination and the Video button and the Audio button lit.

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact.

If an error occurs during the self-test, the switcher locks up and does not operate. If your switcher locks up on power-up, call the Extron S³ Sales & Technical Support Hotline. See the rear cover of this manual for the phone number in your region of the world.

Creating a configuration

The current configuration can be changed using the front panel buttons. Change the current configuration as follows:

1. Press the Esc button to clear any input button indicators, output button indicators, or control button indicators that may be lit.
2. Select video, audio, or both for configuration by pressing the Video button and/or Audio button.
3. Select the desired input and output(s) by pressing the input and output buttons.
 - Input buttons and output buttons light or blink **amber** to indicate video and audio ties, **green** to indicate video only ties, and **red** to indicate audio only ties.
 - To indicate **potential ties**, output buttons **blink** the appropriate color when an input is selected.
 - To indicate **current ties**, output buttons **light steadily** the appropriate color when an input is selected.
 - To clear unwanted outputs, press and release the associated lit output buttons. To indicate **potential unties**, output buttons **blink** the appropriate color when an output is deselected but not untied from the input.
4. Press and release the Enter button to accept the tie or to break an existing tie.
5. Repeat steps 1 through 4 to create or clear additional ties until the desired configuration is complete.

- NOTE**
- Only one video input and one audio input can be tied to an output.
 - If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.
 - If an input with no tie is selected, only the selected input's button lights.
 - When the Video button and the Audio button are lit, if an input with an audio tie but no video tie is selected, the input's button and the output's button light the appropriate color (amber, green, or red).
 - As each input and output is selected, the associated output button blinks the appropriate color to indicate a tentative tie. Buttons for output(s) that were already tied to the input light the appropriate color steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
 - Extron recommends **against** tying a local (VGA) input to a local (VGA) output; the image displayed from such a tie may be overpeaked.
 - If you press the input button for an I/O grouped input and then try to select an output in a different group, you cannot select the associated output button. The associated input button remains lit.

Example 1: Creating a set of video and audio ties

In the following example, input 5 is tied to outputs 3, 4, and 8. The steps show the front panel indications that result from your action.

NOTE This example assumes that there are no ties in the current configuration.

1. Press and release the Esc button (figure 3-4).

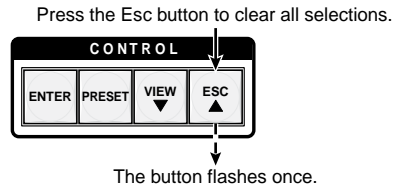


Figure 3-4 — Clear all selections

2. To select video and audio for the tie, if necessary, press and release the Video button and the Audio button. The Video and Audio buttons light (figure 3-5).

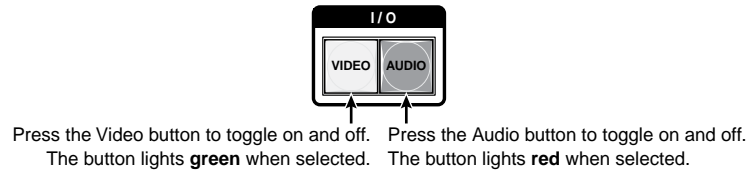


Figure 3-5 — Select video and audio

3. Press and release the input 5 button (figure 3-6).

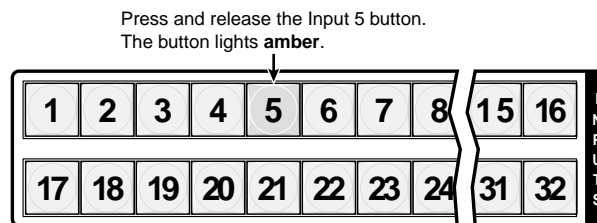


Figure 3-6 — Select an input

4. Press and release the output 3, output 4, and output 8 buttons (figure 3-7).

Press and release the Output 3, Output 4, and Output 8 buttons.
The buttons blink **amber** to indicate that the selected **video** and **audio** inputs will be tied to these outputs.

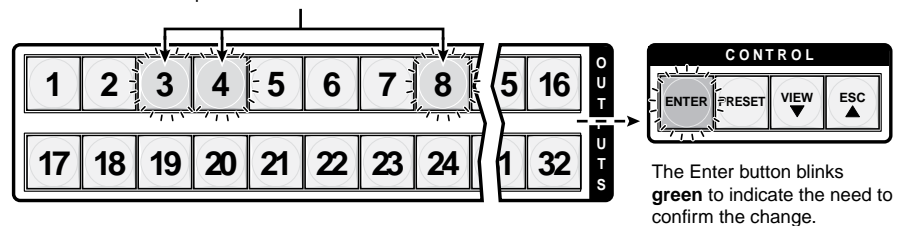


Figure 3-7 — Select the outputs

Operation, cont'd

NOTE You can cancel the entire set of ties at this point by pressing and releasing the Esc button. The Esc button flashes once.

5. Press and release the Enter button (figure 3-8).

Press the Enter button to confirm the configuration change.



All **input buttons** and **output buttons** return to unlit or background illumination.

The Enter button returns to unlit or background illumination.

Figure 3-8 — Press the Enter button

The current configuration (figure 3-9) is now:

- Input 5 video and audio are tied to output 3, output 4, and output 8

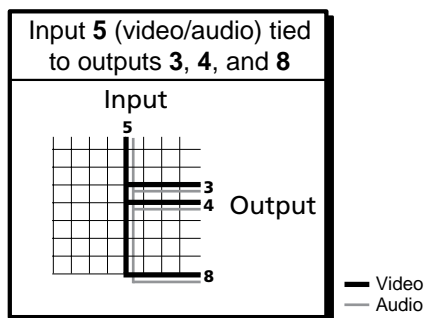


Figure 3-9 — Example 1, final configuration

Example 2: Adding a tie to a set of video and audio ties

In the following example, a new video tie is added to the current configuration. The steps show the front panel indications that result from your action.

NOTE This example assumes that you have performed example 1.

1. Press and release the Esc button (figure 3-10).

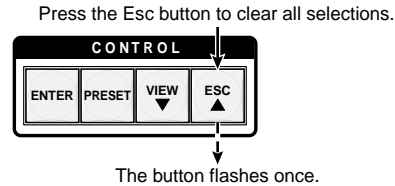


Figure 3-10 — Clear all selections

2. To select video only for the tie, if necessary, press and release the Video button and the Audio button (figure 3-11).

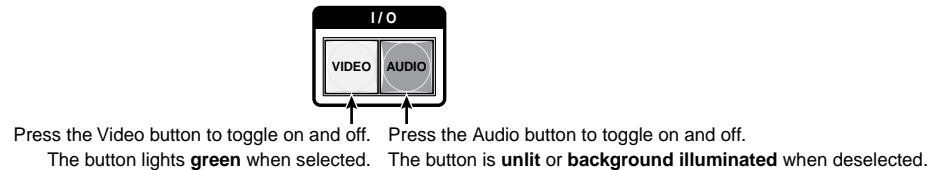


Figure 3-11 — Select video only

3. Press and release the input 5 button (figure 3-12).

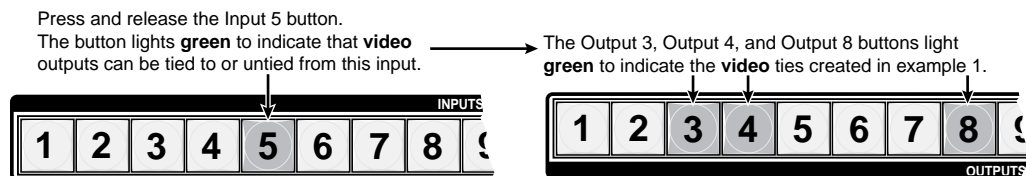


Figure 3-12 — Select an input

4. Press and release the output 1 button (figure 3-13).

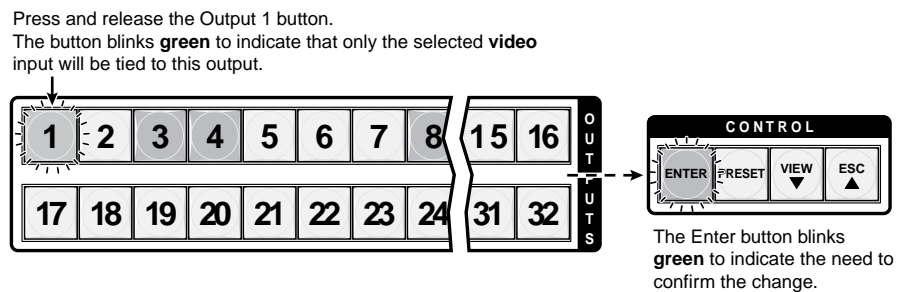


Figure 3-13 — Select the output

Operation, cont'd

5. Press and release the Enter button (figure 3-14).

Press the Enter button to confirm the configuration change.



-----> All **input buttons** and **output buttons** return to unlit or background illumination.

The Enter button returns to unlit or background illumination.

Figure 3-14 — Press the Enter button

The current configuration (figure 3-15) is now:

- Input 5 video is tied to output 1, output 3, output 4, and output 8.
- Input 5 audio is tied to output 3, output 4, and output 8.

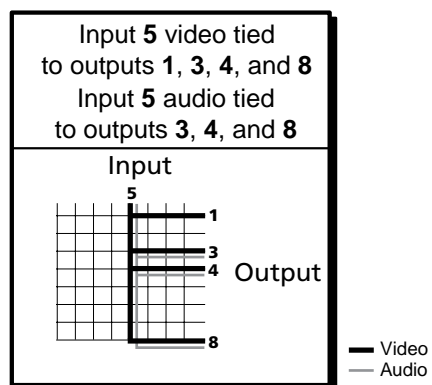


Figure 3-15 — Example 2, final configuration

Example 3: Removing a tie from a set of video and audio ties

In the following example, an existing audio tie is removed from the current configuration. The steps show the front panel indications that result from your action.

NOTE This example assumes that you have performed example 1 and example 2.

1. Press and release the Esc button (figure 3-16).

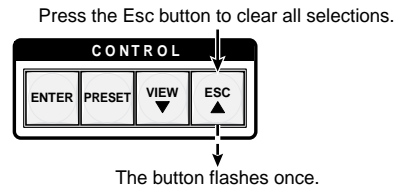


Figure 3-16 — Clear all selections

2. To select audio only for the tie, if necessary, press and release the Video button and the Audio button (figure 3-17).

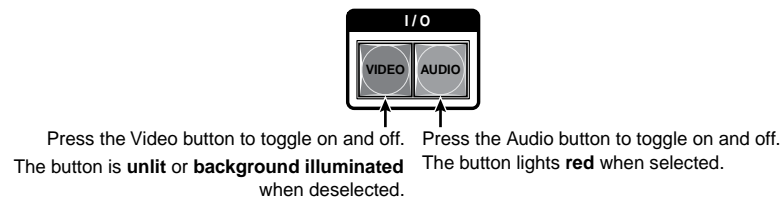


Figure 3-17 — Select audio only

3. Press and release the input 5 button (figure 3-18).

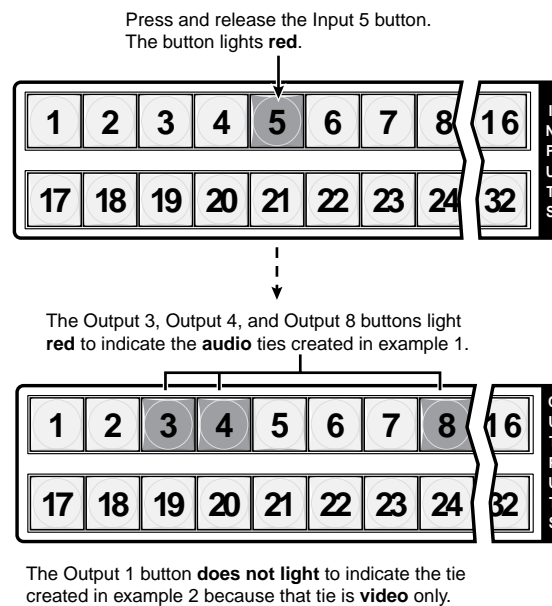


Figure 3-18 — Select an input

Operation, cont'd

4. Press and release the output 4 button (figure 3-19).

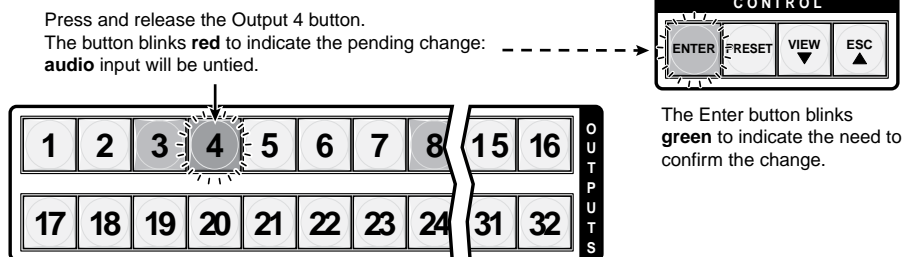
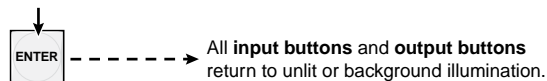


Figure 3-19 — Deselect the output

5. Press and release the Enter button (figure 3-20).

Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

Figure 3-20 — Press the Enter button

The current configuration (figure 3-21) is now:

- **Video** — Input 5 video is tied to output 1, output 3, output 4, and output 8.
- **Audio** — Input 5 audio is tied to output 3 and output 8.

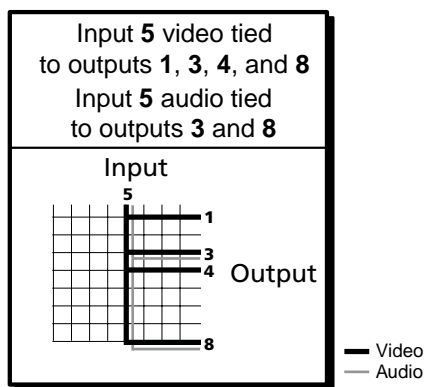


Figure 3-21 — Example 3, final configuration

Viewing a configuration

The current configuration can be viewed using the front panel buttons. The *View-only* mode prevents inadvertent changes to the current configuration. *View-only* mode also provides a way to mute audio or RS-232 outputs (see “Muting and unmuting audio/RS-232 outputs” on page 3-32).

View the current configuration as follows:

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button. All of the buttons light for outputs that are **not** tied as follows:
 - **Amber:** No tied video **or** audio input
 - **Green:** No tied video input
 - **Red:** No tied audio input
3. Select video, audio, or both to view by pressing the Video button and/or the Audio button.
4. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.

- NOTE**
- *When you enter View-only mode, the output buttons light for all outputs without ties. Likewise, when you press an output button for which there are no ties, the output buttons light for all outputs without ties.*
 - *To see all ties of the current configuration, press and release each input and output button, one at a time, with the Video button and the Audio button lit.*
 - *In View-only mode, you can view video and audio, video-only, or audio-only ties. Pressing and releasing the Video button and the Audio button toggles each selection on and off.*
 - *When you view video and audio ties, the Video button is lit green and the Audio button is lit red. After you select an input or output, the output buttons light different colors to show where video and audio ties are not the same (audio is broken away). Amber indicates video and audio, green indicates video only, and red indicates audio only..*
 - *After 30 seconds of front panel inactivity, View-only mode automatically deselects.*

Operation, cont'd

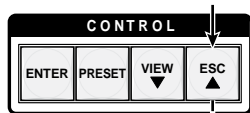
Example 4: Viewing video and audio (RS-232), audio (RS-232) only, and video only ties

In the following example, we view the video and audio (or RS-232), audio- (or RS-232-) only, and video-only ties in the current configuration. The steps show the front panel indications that result from your action.

NOTE *This example assumes that you have performed example 1, example 2, and example 3.*

1. Press and release the Esc button (figure 3-22).

Press the Esc button to clear all selections.



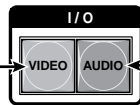
The button flashes once.

Figure 3-22 — Clear all selections

2. Press and release the View button to enter *View-only* mode. The View button lights red.
3. To select both video and audio for viewing, if necessary, press and release the Video button and the Audio button (figure 3-23).

Press the Video button to toggle on and off.

The button lights **green** when selected.



Press the Audio button to toggle on and off.

The button lights **red** when selected.

Until you select an input, the buttons for all untied outputs light **amber** if **no inputs** are tied, **green** if **no video inputs** are tied (only audio is tied), or **red** if **no audio or RS-232 inputs** are tied (only video is tied).

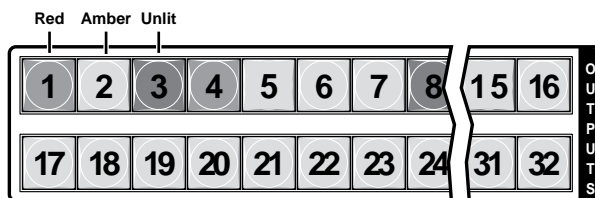


Figure 3-23 — Select video and audio

4. Press and release the input 5 button (figure 3-24).

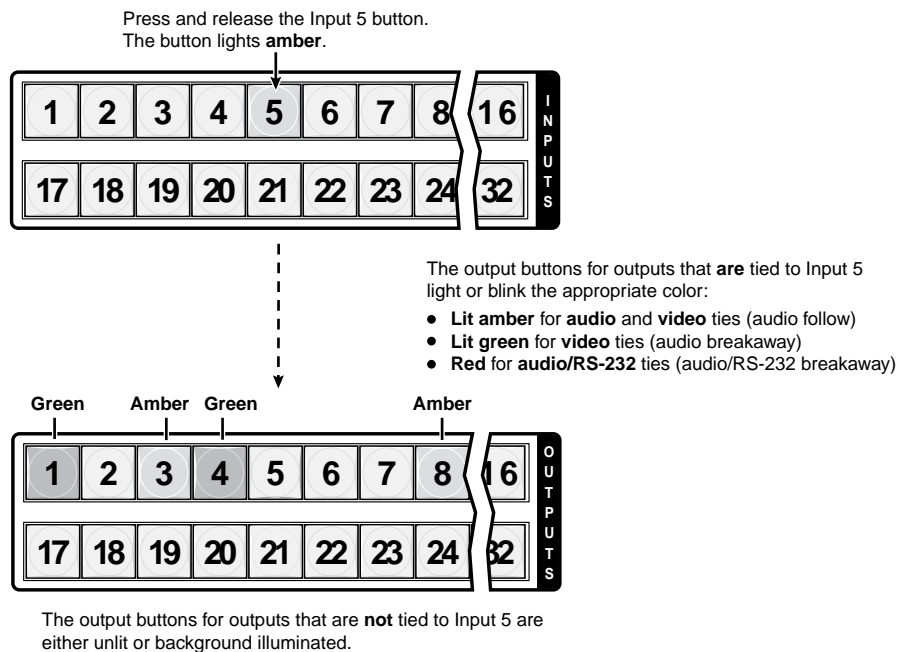


Figure 3-24 — Select an input

NOTE You can also view a set of ties by selecting a tied output. To demonstrate this, note the number of a lit output button, and then press and release the output button for an untied (unlit or background illumination) output. Observe that all of the untied outputs light. Then press the output button that you noted previously and observe that the selected output button, the tied input button (input 5), and the output buttons light for all of the outputs that are tied to the input.

5. Press and release the Video button to deselect video (figure 3-25).

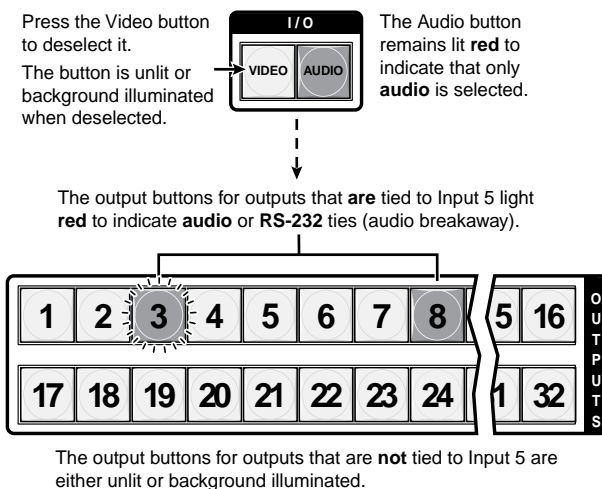



Figure 3-25 — Deselect video to view audio ties only

- Press the Video button to select it.
- The button lights **green** when selected.
- Press the Audio button to deselect it.
- The button is **unlit** or **background illuminated** when deselected.
- The output buttons for outputs that **are** tied to Input 5 light **green** to indicate **video** ties (audio breakaway).
-
- The diagram shows an I/O panel with two buttons labeled VIDEO and AUDIO. The VIDEO button is shaded green, indicating it is selected. Below the I/O panel, a dashed arrow points to a set of output buttons. The output buttons are arranged in two rows. The top row contains buttons 1 through 8, and the bottom row contains buttons 17 through 24. Buttons 4 and 8 in the top row are shaded green, indicating they are tied to Input 5. To the right of the output buttons is a vertical label that reads OUTPUTS.
- The output buttons for outputs that **are not** tied to Input 5 are either unlit or background illuminated.

If video ties are established for input 5, the output buttons light green for all video outputs tied to input 5. If no ties are established for input 5, all output buttons return to either unlit or to background illumination.

- Press the View button to exit *View-Only* mode.
- 
- All **input buttons** and **output buttons** return to unlit or background illumination.
- The View button returns to unlit or background illumination.

I/O grouping

I/O grouping is a matrix switcher feature that allows you to subdivide the front panel controls of the matrix into four smaller functional sub-switchers and limit tie creation **using the front panel only**. Inputs and outputs can be assigned to one of four groups or not assigned to any group.

When you are creating ties on the front panel, inputs and outputs that are assigned to a group can be tied only to other outputs and inputs within the same group. For example, a front panel operator cannot tie an input that is assigned to group 1 to an output that is assigned to group 2. Ungrouped inputs and outputs can be switched to outputs and inputs in any group. Ties between groups (an input in group 1 tied to an output in group 2) **can** be created under RS-232/RS-422 or Ethernet control.

Suggested applications for the I/O grouping feature include:

- Segregating specific video formats to prevent an input in one video format from being inadvertently applied to an output device that supports another video format (figure 3-28)
- Segregating input and output devices that are in separate rooms
- Segregating input and output devices on which you are distributing audio on the audio/RS-232 wire pair from those on which you are distributing RS-232 signals.
- Isolating video from being displayed on specific output devices for operational security reasons

NOTE All of the equipment in this figure is connected through the appropriate MTP transmitter or receiver.

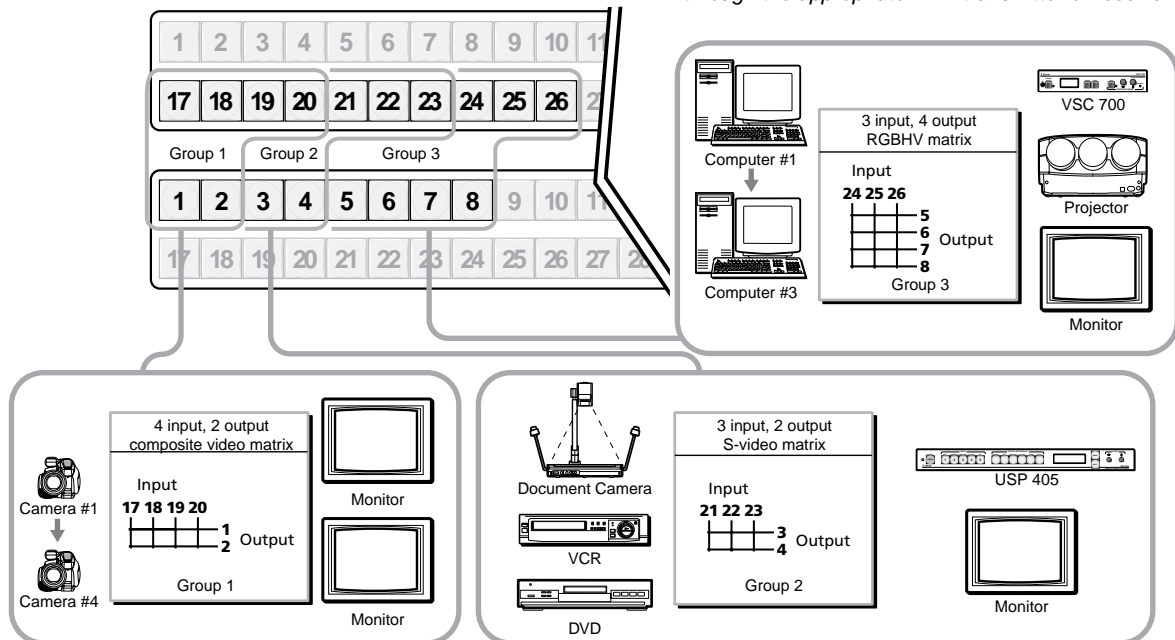


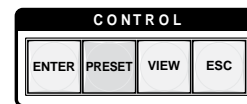
Figure 3-28 — I/O grouping of incompatible video formats

Operation, cont'd

The I/O groups can be set up on the front panel or by using RS-232/RS-422 and LAN ports and either the SIS or the Windows control program (see chapter 4, "Programmer's Guide", and chapter 5, "Matrix Software"). Create I/O groups on the front panel as follows:

NOTE *I/O groups are protected when front panel lock mode 2 is selected. You can view the groups in lock mode 2, but you cannot change them from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-46.*

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *I/O Group* mode, press and **hold** the Input 1 and Output 1 buttons until the input and output buttons light to display the ungrouped inputs and outputs.
3. Press and release one of the Control buttons to select a group:
 - Press the Enter button to select group 1.
 - Press the Preset button to select group 2.
 - Press the View button to select group 3.
 - Press the Esc button to select group 4.
4. Select the desired input(s) and output(s) to assign to the group by pressing the input and output buttons.
5. Press and release the Video and Audio button to exit the *I/O Group* mode, or allow the mode to time out after approximately 30 seconds.



- NOTE**
- *Ties between groups (an input in group 1 tied to an output in group 2) **can** be created under RS-232/RS-422 or Ethernet control.*
 - *Ties that were created before I/O groups were created remain valid, even if they include inputs and outputs in different groups.*
 - *Presets can be created under RS-232/RS-422 or Ethernet control that tie inputs and outputs across group boundaries. These presets **are** selectable from the front panel.*
 - *An input or output can be assigned to only one group. If you assign an input or output to a group and that input or output is already assigned to a different group, the older grouping is discarded in favor of the new grouping.*
 - *You **can** break audio away from the video for a given input or output (assigned to different groups) by isolating only video or only audio using the front panel Video and/or Audio buttons after you select I/O Group mode (between steps 2 and 3).*

*Audio breakaway across different groups **can be** confusing when you are operating the front panel. Breakaway grouping **is not displayed** by the Matrix Switchers Control Program, HTML pages, or SIS commands; and is **not** recommended (breakaway ties, once created, are displayed).*

- *For I/O groups to have any function, at least two groups must be created.*

Example 5: Grouping inputs and outputs

In the following an example, several switcher inputs and outputs are assigned to groups. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-29).

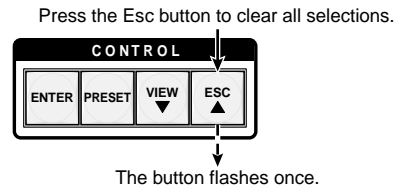


Figure 3-29 — Clear all selections

2. To enter *I/O Group* mode, simultaneously press and **hold** the Input 1 and Output 1 buttons for approximately 2 seconds and then release the buttons (figure 3-30).

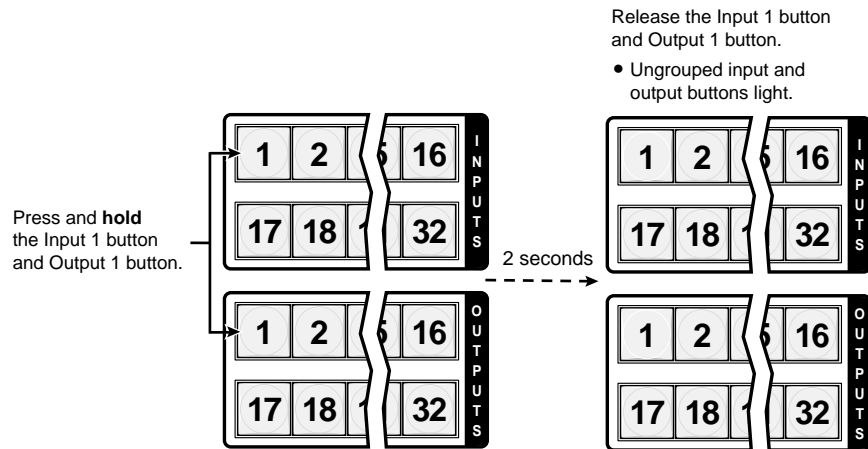


Figure 3-30 — Select I/O Group mode

3. Press and release the Enter button to select group 1 (figure 3-31).

Press and release the Enter button to select group 1.
The button lights **amber** to indicate the selection.

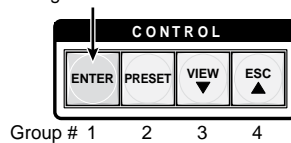


Figure 3-31 — Select an I/O group

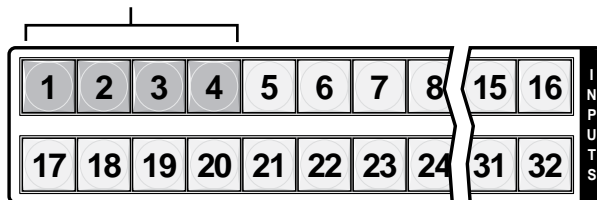
NOTE *I/O groups are protected when front panel lock mode 2 is selected. You can view the groups in lock mode 2, but you cannot change them from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-46.*

If front panel lock mode 2 is selected and you try to perform step 4, the actions are ignored and the Enter, Video, and Audio buttons flash.

Operation, cont'd

4. Press and release the Input 1 through 4 and Output 1 through 4 buttons (figure 3-32).

Press and release the Input 1 through Input 4 buttons.
The selected buttons light **green**.



Press and release the Output 1 through Output 4 buttons.
The selected buttons light **green**.

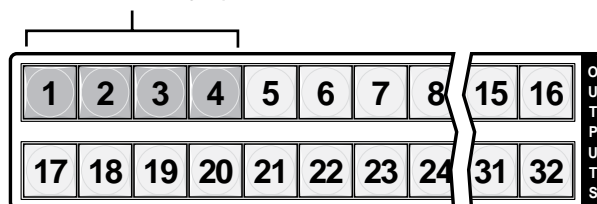


Figure 3-32 — Assign inputs and outputs

5. Press and release the Preset button to select group 2 (figure 3-33).

Press and release the Preset button to select group 2.
The button lights **amber** to indicate the selection.

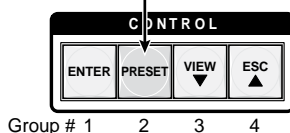
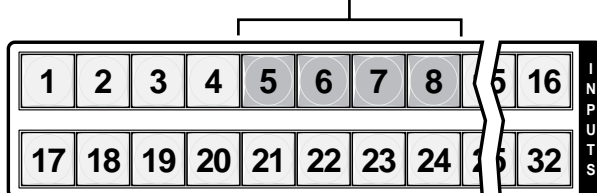


Figure 3-33 — Select an I/O group

6. Press and release the Input 5 through 8 and Output 5 through 8 buttons (figure 3-34).

Press and release the Input 5 through Input 8 buttons.
The selected buttons light **green**.



Press and release the Output 5 through Output 8 buttons.
The selected buttons light **green**.

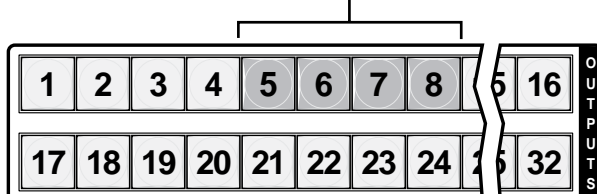
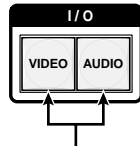


Figure 3-34 — Assign inputs and outputs

-
7. Simultaneously press and release the Video button and Audio button (figure 3-35). The switcher exits *I/O Group* mode.

NOTE *If you do nothing for approximately 30 seconds, the front panel times out and the switcher exits I/O Group mode.*

- Group 1 consists of inputs 1 through 4 and outputs 1 through 4.
- Group 2 consists of inputs 5 through 8 and outputs 5 through 8.



Simultaneously, press and release both buttons.

Figure 3-35 — Deselect I/O Group mode

Using presets

The current configuration (configuration 0) can be saved as a preset in any one of 32 preset memory addresses. All 32 presets are assigned to the input buttons and output buttons and are available to be either saved or retrieved from the front panel. When a **preset** is retrieved from memory, it becomes the **current configuration**.

- NOTE**
- Only the audio and video ties are stored and recalled; audio gain settings are not saved, and they do not change when a preset is recalled.
 - Presets **cannot** be viewed from the front panel unless recalled as the current configuration. Presets **can** be viewed using Extron's Windows-based control program. See chapter 5, "Matrix Software", for more details.
 - The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
 - When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.
 - Figure 3-36 shows the presets associated with the two input and output button configurations for the MTPX Plus matrix switchers.

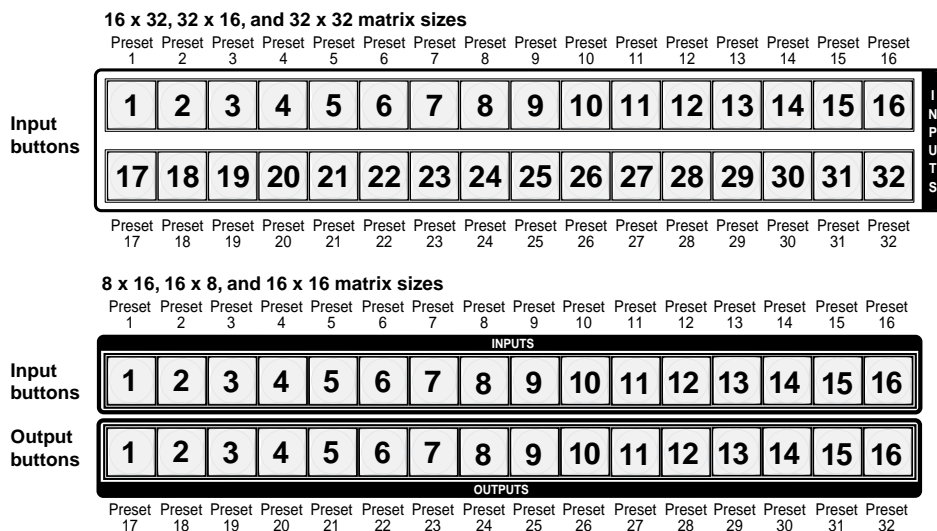


Figure 3-36 — Preset locations

Example 6: Saving a preset

In the following example, the current configuration is saved as a preset. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-37).

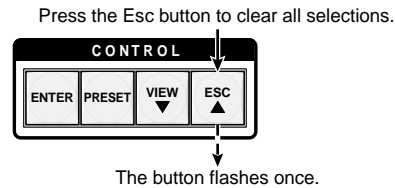


Figure 3-37 — Clear all selections

2. Press and **hold** the Preset button for approximately 2 seconds until it blinks (figure 3-38).

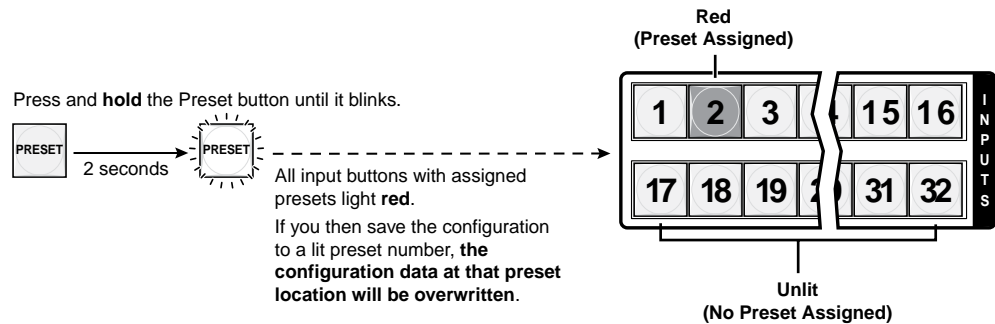


Figure 3-38 — Enter Save Preset mode

3. Press and release the input or output button for the desired preset (figure 3-39).

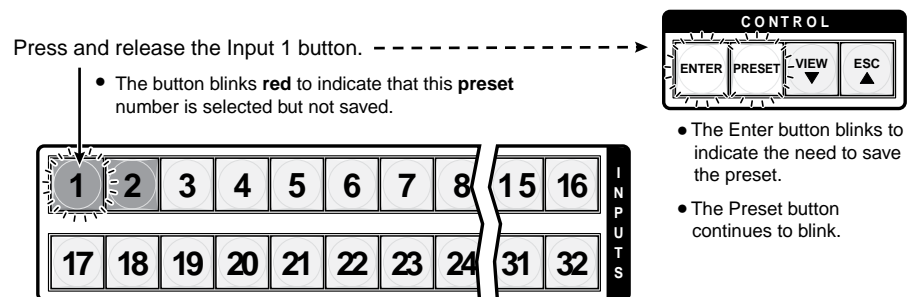
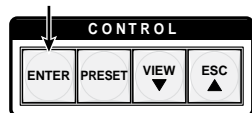


Figure 3-39 — Select the preset

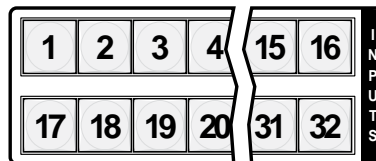
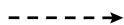
Operation, cont'd

4. Press and release the Enter button (figure 3-40). The current configuration is now stored in the selected memory location.

Press the Enter button to save the preset.



The Enter and Preset buttons return to unlit or background illumination.



All input buttons return to unlit or background illumination.

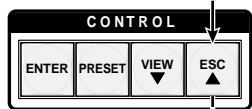
Figure 3-40 — Press the Enter button

Example 7: Recalling a preset

In the following example, a preset is recalled to become the current configuration. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-41).

Press the Esc button to clear all selections.



The button flashes once.

Figure 3-41 — Clear all selections

2. Press and release the Preset button (figure 3-42).

Press and release the Preset button.

The Preset button lights.



All input buttons with assigned presets light red.

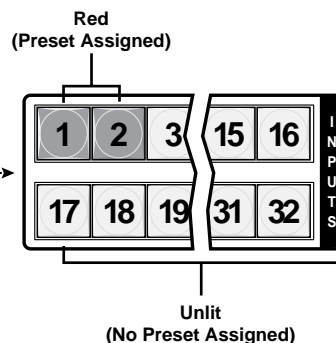


Figure 3-42 — Enter Recall Preset mode

3. Press and release the input or output button for the desired preset (figure 3-43).

Press and release the Input 1 button.

The button blinks **red** to indicate that this preset number is selected but not recalled.

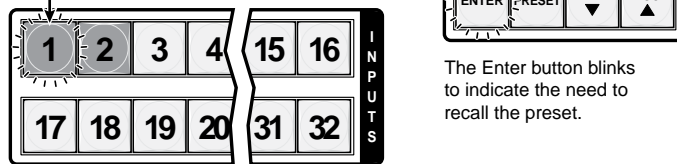
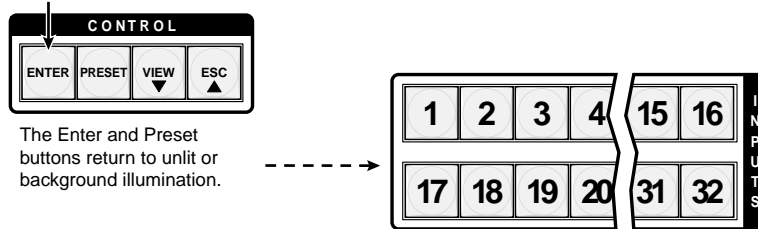


Figure 3-43 — Select the preset

4. Press and release the Enter button (figure 3-44). The configuration stored in the selected memory location is now the current configuration and can be viewed in the *View-only* mode (see example 4).

Press the Enter button to recall the preset.



All input buttons return to unlit or background illumination.

Figure 3-44 — Press the Enter button

Muting and unmuting audio/RS-232 outputs

Individual audio or RS-232 outputs can be muted or unmuted as follows:

NOTE *Mutes are protected when front panel Lock mode 2 is selected. You can view the status of the output (muted or unmuted) in Lock mode 2 but you cannot change it from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-46.*

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button.
3. If necessary to select audio and deselect video, press the Video button and/or the Audio button.
4. One at a time, press and **hold** the button(s) for the desired output(s) for approximately 2 seconds. The output button(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
5. Press and release the View button to return to normal switcher operation.

- NOTE**
- You can mute only audio or RS-232 (not video) outputs. Pressing and releasing the Video button and the Audio button toggles each selection on and off.
 - When you enter View-only mode, the output LEDs turn **on** for all outputs **without** ties.
 - If the audio/RS-232 wire pair of the selected input is defined as RS-232 (see "Defining the audio/RS-232 wire pair" on page 3-49), the serial output is muted.
 - Mutes are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.

Example 8: Muting and unmuting an audio/RS-232 output

In the following example, several switcher outputs are muted and unmuted. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-45).

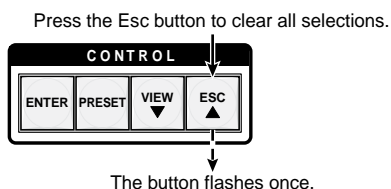


Figure 3-45 — Clear all selections

2. Press and release the View button to enter *View-only* mode. The View button lights red.
3. To select audio (or RS-232) for viewing and muting, if necessary, press and release the Audio button (figure 3-46).

NOTE *This example shows the front panel indications if example 1, example 2, and example 3 have been completed.*

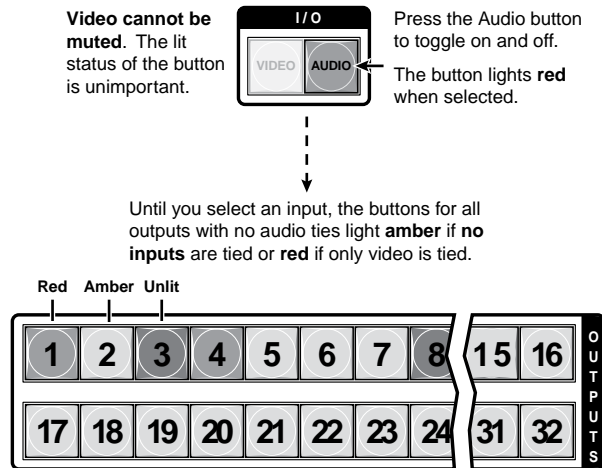


Figure 3-46 — Select audio only

NOTE Output mutes are protected when front panel Lock mode 2 is selected. You can view the mutes in Lock mode 2 but you cannot change them from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-46.

If front panel Lock mode 2 is selected and you try to perform steps 4 and 5, the actions are ignored.

4. **One at a time**, press and **hold** the Output 3 button and then the Output 4 button (figure 3-47) for approximately 2 seconds until each button begins to blink. The output 3 and output 4 audio or RS-232 signals are muted.

Mute outputs one at a time.

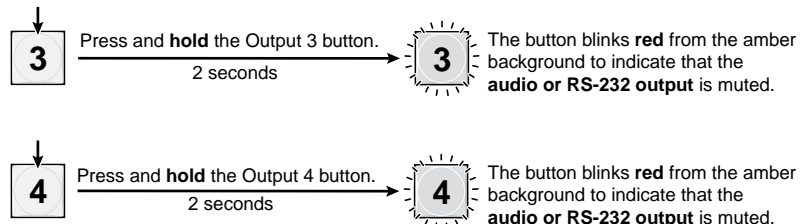


Figure 3-47 — Mute the outputs

5. **One at a time**, press and **hold** the Output 3 button and then the Output 4 buttons (figure 3-48) for approximately 2 seconds until each button returns to its previous state. The output 3 and output 4 audio or RS-232 signals are unmuted.

Unmute outputs one at a time.

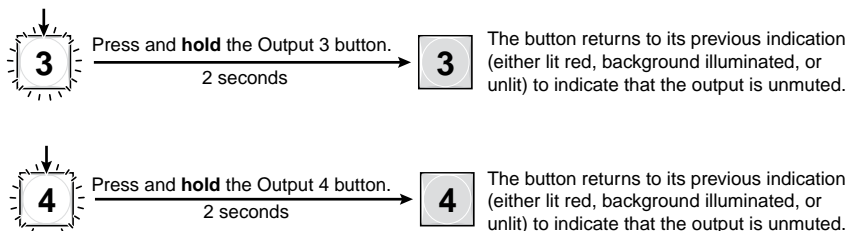


Figure 3-48 — Unmute the outputs

- Press and release the View button to exit *View-only* mode (figure 3-49).

Press the View button
to exit *View-Only* mode.



All **input buttons** and **output buttons**
return to unlit or background illumination.

The View button returns to
unlit or background
illumination.

Figure 3-49 — Press the View button to exit View-only mode

Viewing and adjusting the TP input audio level

The audio level of each twisted pair input can be displayed and adjusted through a range of -18 dB to +24 dB to ensure that there is no noticeable volume difference among sources (figure 3-50). The audio level can be adjusted from the front panel or under serial port or Ethernet control. The default audio level is 0 dB.

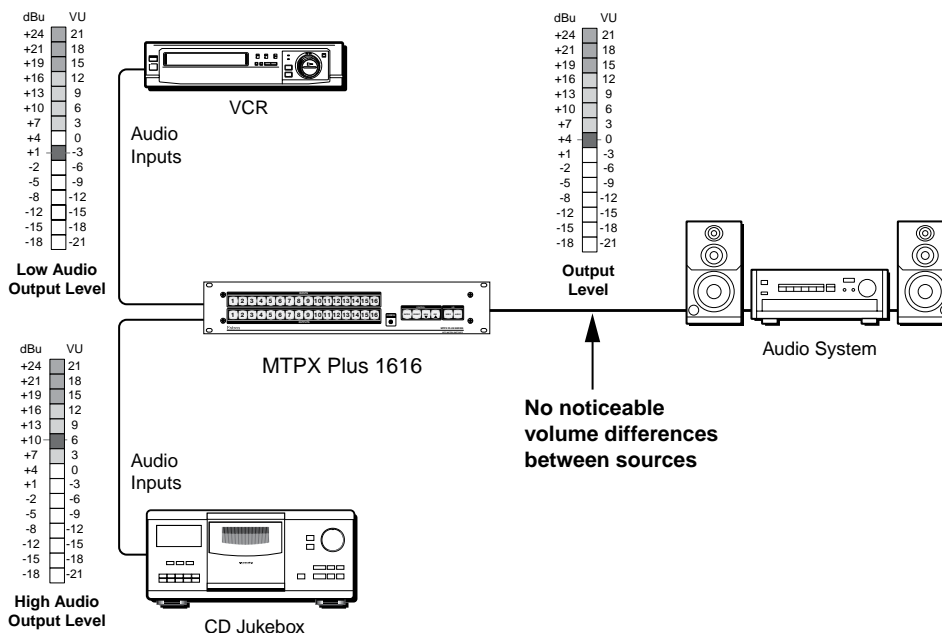


Figure 3-50 — Audio gain and attenuation

- Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
- To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
- Press and release an input button to select an input. The output buttons display the audio level for the selected input; the more output LEDs lit, the greater the gain or attenuation. Green output buttons indicate a gain (+) audio level and red output buttons indicate an attenuation (-) level.

Audio gain and attenuation is displayed differently on different models.

- Switchers with 32 output buttons — Each output button indicates 1 dB when lit steadily. See the table on page 3-36.
 - Switchers with 16 output buttons — Each output button indicates 1 dB when blinking and 2 dB when lit steadily. See the table on page 3-37.
4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level.
 5. Press and release the Audio button to exit the *Audio* mode. The Audio button stops blinking.

- NOTE**
- Pressing the Enter or Preset button also exits Audio mode. Pressing the Preset button changes to Recall Preset mode.
 - There is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.
 - The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
 - Exiting Audio mode by pressing the Audio button always returns the I/O configuration to video and audio selected for configuration (Video and Audio buttons lit).

Example 9: Viewing and adjusting an input audio level

- NOTE** This procedure can only be performed if the audio/RS-232 wire pair of the input is defined as audio.

- NOTE** Because of the different gain and attenuation display schemes, the input audio levels that result from the following example are shown twice: as displayed on a 32-output button switcher and on a 16-output button switcher. The 32-button displays show the actions that led up to the display. For simplicity, the figures showing 16-button displays show the gain or attenuation display only, not the actions that lead up to it.

In the following example, an audio level is viewed and adjusted. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-51).

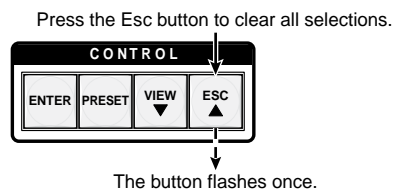


Figure 3-51 — Clear all selections

2. Press and **hold** the Audio button for approximately 2 seconds (figure 3-52).

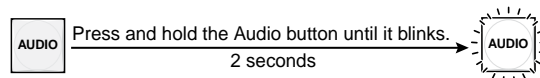
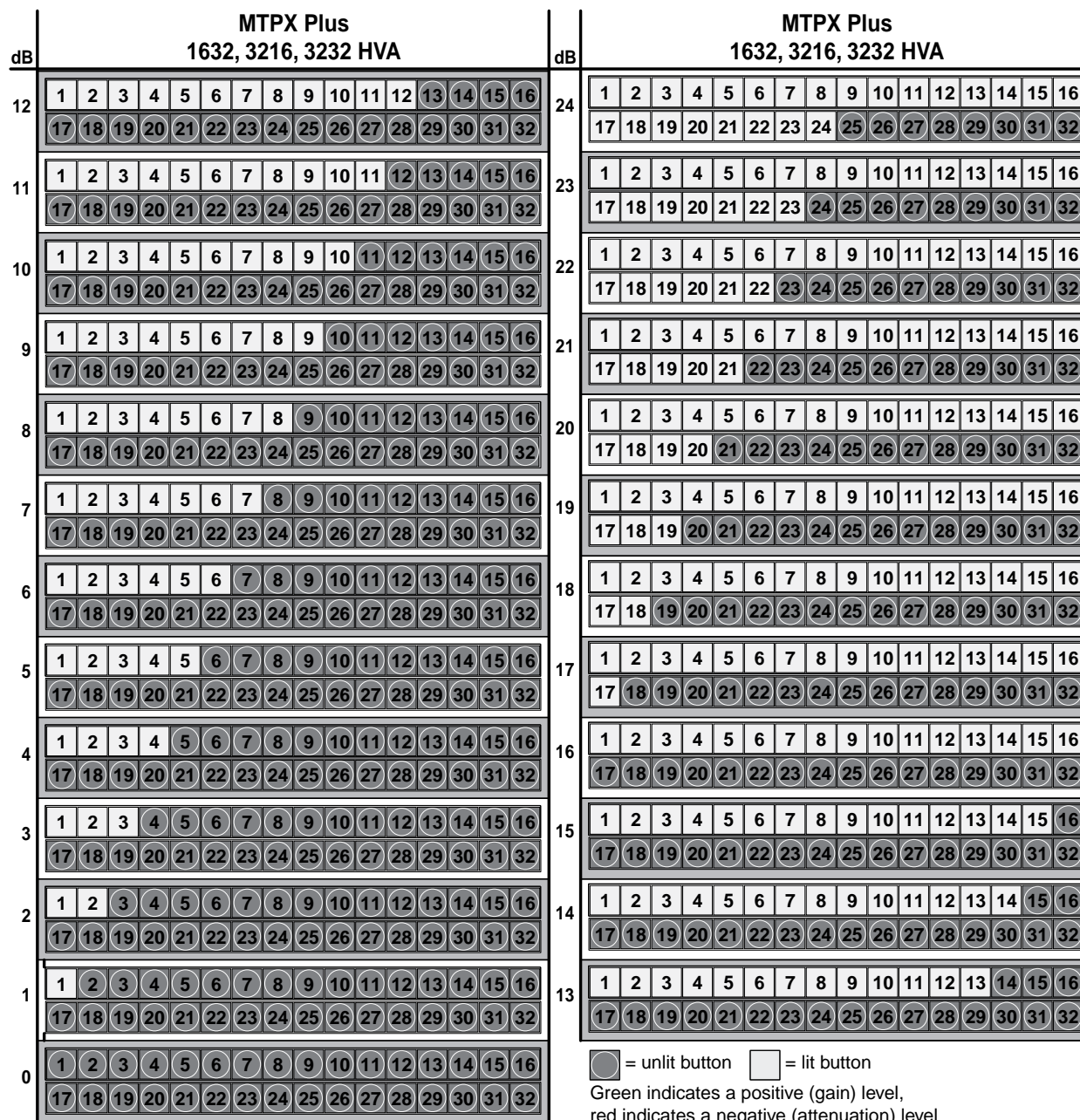


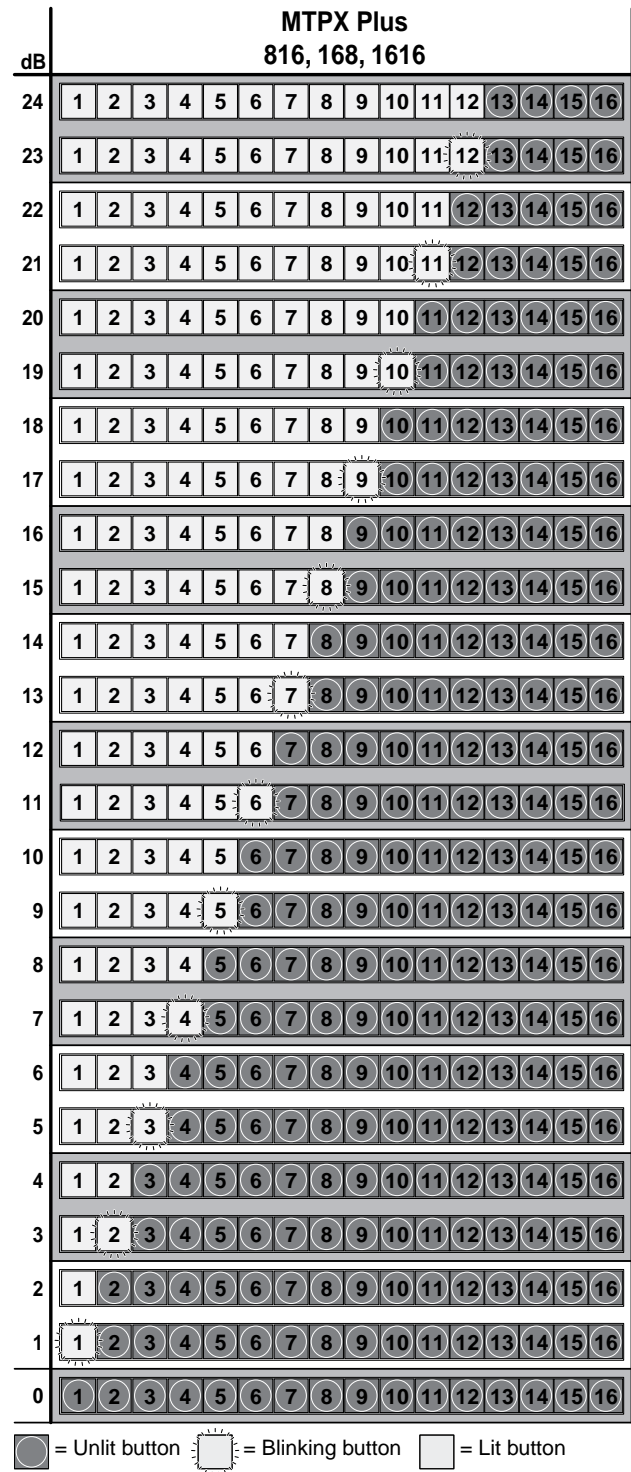
Figure 3-52 — Select Audio mode

Operation, cont'd

32-output button audio gain and attenuation display



16-output button audio gain and attenuation display



Green indicates a positive (gain) level.
Red indicates a negative (attenuation) level.

Operation, cont'd

3. Press and release the Input 5 button (figure 3-53).

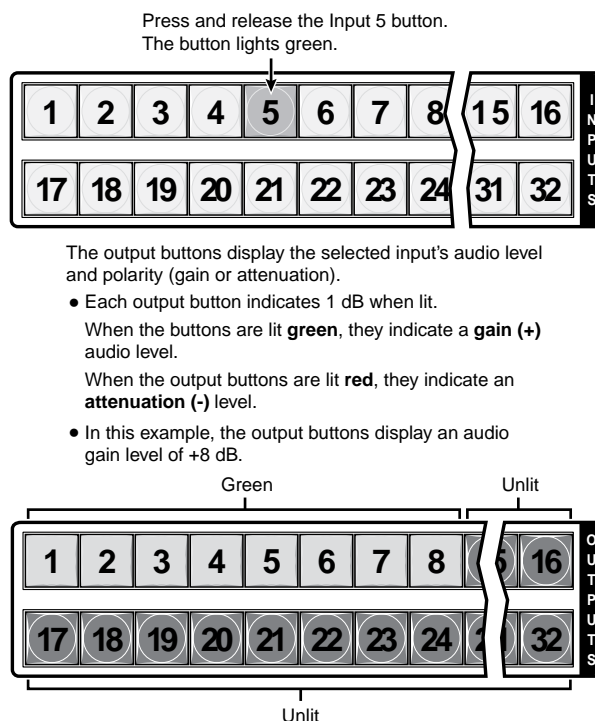


Figure 3-53 — Select an input

Figure 3-54 shows the same level (+8 dB) as in figure 3-53, but displayed on a 16-output-button switcher, such as an MTPX Plus 816.

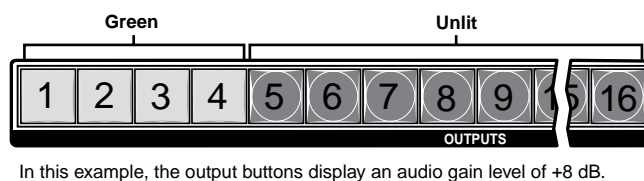


Figure 3-54 — Level display on a 16-output-button switcher

4. Press and release the View (▼) button once (figure 3-55) to decrease the input audio level by 1 dB.

Press and release the View (▼) button several more times (figure 3-57) to decrease the input audio level by 1 dB per button press. Note the output button indication changes that occur each time the View (▼) button is pressed.

Figure 3-55 shows the result of pressing the View (▼) button a total of nine times. Note that the level is now displayed in red to indicate a negative level.

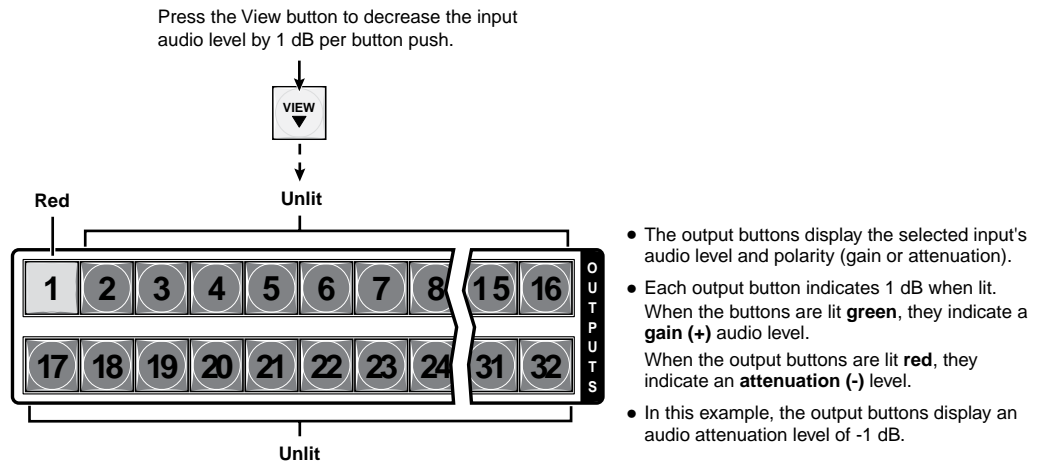
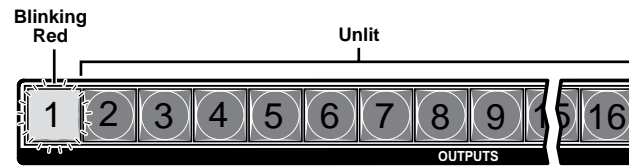


Figure 3-55 — Adjust the input audio level

Figure 3-56 shows the same level (-1 dB) as in figure 3-55, but displayed on a 16-output-button switcher, such as a MTPX Plus 1616.



In this example, the output buttons display an audio gain level of -1 dB.

Figure 3-56 — Level display on a 16-output-button switcher

5. Press and release the Audio button (figure 3-57).

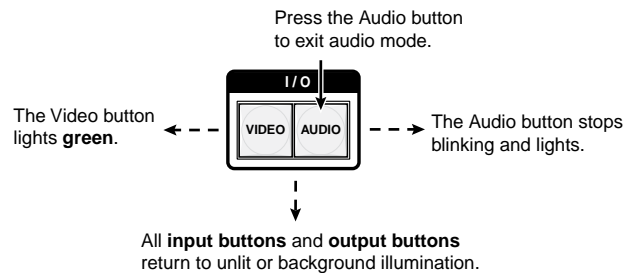


Figure 3-57 — Deselect Audio mode

Viewing and adjusting the local output volume

The audio level of each local output can be displayed and adjusted through a range of 100% (no attenuation) to 0% (maximum [76 dB] attenuation). The audio level can be adjusted from the front panel or under RS-232/RS-422 or Ethernet control. The default volume is 100% (no attenuation).

NOTE *Output volume is protected when front panel Lock mode 2 is selected. You can view the volume in Lock mode 2 but you cannot adjust it from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-46.*

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
3. Press and release an output button to select an output. The input buttons display the volume level for the selected output. As a general rule, the more buttons that are lit, the higher the volume. The fewer buttons that are lit, the lower the volume.

For a more detailed analysis of decoding the displayed value, see “Reading the displayed volume”, below.

4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio volume.
5. Press and release the Audio button to save the audio settings and exit the *Audio* mode. The Audio button stops blinking.

































































































- NOTE**
- Only the volume for the local audio outputs (outputs 1 through 4 [matrix sizes 816, 168, and 1616] or outputs 1 through 8 [matrix sizes 1632, 3216, and 3232]) is adjustable. Outputs outside the local range cannot be selected in step 3.
 - There is one audio volume level setting per local output. The audio level setting is shared by the left and right audio inputs.
 - The audio volume levels are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
 - Exiting *Audio* mode by pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red.
 - Pressing the Enter or Preset button also exits *Audio* mode. Pressing the Preset button changes to Recall Preset mode.


Reading the displayed volume

NOTE *This section is a detailed look at reading the output volume display on the switcher's front panel. If you do not need to read the exact value of the volume setting, skip this section.*

There are 65 steps of volume attenuation, with 1 dB per step (button push), except for 0-to-1, which is 13 dB. At maximum attenuation, no input buttons are lit, 76 dB of attenuation is applied, and the audio output is effectively muted. At no attenuation, all input buttons are lit and the output volume is equal to the input signal plus any gain or attenuation that is applied to that specific input using the input audio level adjustment. See “Viewing and adjusting the TP input audio level”, on page 3-34. See the table on the next page to read the volume display for each display scheme.

Audio volume display

Highest # input button lit		dB of attenuation	Output volume	Highest # input button lit		dB of attenuation	Output volume
16-input switcher	32-input switcher			16-input switcher	32-input switcher		
None	None	76	0%				
	 1	63	5.5%	 9	 17	31	53.5%
	 1	62	7%		 17	30	55%
	 2	61	8.5%		 18	29	56.5%
 1	 2	60	10%	 9	 18	28	58%
 2	 3	59	11.5%	 10	 19	27	59.5%
	 3	58	13%		 19	26	61%
	 4	57	14.5%		 20	25	62.5%
 2	 4	56	16%	 10	 20	24	64%
 3	 5	55	17.5%	 11	 21	23	65.5%
	 5	54	19%		 21	22	67%
	 6	53	20.5%		 22	21	68.5%
 3	 6	52	22%	 11	 22	20	70%
 4	 7	51	23.5%	 12	 23	19	71.5%
	 7	50	25%		 23	18	73%
	 8	49	26.5%		 24	17	74.5%
 4	 8	48	28%	 12	 24	16	76%
 5	 9	47	29.5%	 13	 25	15	77.5%
	 9	46	31%		 25	14	79%
	 10	45	32.5%		 26	13	80.5%
 5	 10	44	34%	 13	 26	12	82%
 6	 11	43	35.5%	 14	 27	11	83.5%
	 11	42	37%		 27	10	85%
	 12	41	38.5%		 28	9	86.5%
 6	 12	40	40%	 14	 28	8	88%
 7	 13	39	41.5%	 15	 29	7	89.5%
	 13	38	43%		 29	6	91%
	 14	37	44.5%		 30	5	92.5%
 7	 14	36	46%	 15	 30	4	94%
 8	 15	35	47.5%	 16	 31	3	95.5%
	 15	34	49%		 31	2	97%
	 16	33	50.5%		 32	1	98.5%
 8	 16	32	52%	 16	 32	0	100%

 = blinking LED

Operation, cont'd

Depending on the switcher model, the input buttons blink or light sequentially to indicate the approximate volume of the selected output. Volume is defined as a percentage of the input audio signal that is applied to the output. From 0% of volume, the first Esc (▲) button push applies 5.5% of the input audio signal. From 5.5% on, each Esc (▲) push applies 1.5% more of the input audio signal to the output:

- **Push Esc (▲) button again** — $5.5\% + 1.5\% = 7\%$ volume
 - **Switchers with 16 input buttons** — Indicated by the Input 1 button blinking slowly
 - **Switchers with 32 input buttons** — Indicated by the Input 1 button lit steadily
- **Push Esc (▲) button twice more** — $7\% + 1.5\% + 1.5\% = 10\%$ volume
 - **Switchers with 16 input buttons** — Indicated by the Input 1 button lit steadily
 - **Switchers with 32 input buttons** — Indicated by the Input 1 and Input 2 button lit steadily
- **Push Esc (▲) button nineteen times more** — $10\% + (19 \cdot 1.5\%) = 38.5\%$ volume
 - **Switchers with 16 input buttons** — Indicated by the Input 1 through 5 buttons lit steadily and the Input 6 button blinking
 - **Switchers with 32 input buttons** — Indicated by the Input 1 through Input 11 buttons lit steadily and the Input 12 button blinking

When all input buttons are lit, the audio output is 100% of the audio input level.

Another way to view the volume level is to think in terms of the attenuation that is applied to the output. Attenuation reduction is indicated by the lit or blinking input buttons: when fewer input buttons are lit, attenuation is greater (and the volume is quieter).

- At minimum volume, all input buttons are unlit or background illuminated and 76 dB of attenuation is applied to the output. The audio output is effectively muted.
- The first step of volume increase causes the Input 1 button to blink slowly. Attenuation is reduced by 13 dB (63 dB of attenuation is applied to the output). There is no change in the volume indication.
- The second step of volume increase reduces the attenuation by an additional 1 dB (62 dB of attenuation is applied to the output). The front panel display is unchanged.
- Successive steps of volume increase cause consecutive input buttons to first blink and then light steadily.

For example: When lit steadily, the Input 3 button indicates the following, depending on the number of input buttons the switcher has:

- **Switchers with 16 input buttons** — 52 dB of attenuation when compared to the Input 3 button blinking (53 dB to 55 dB of attenuation). The blinking Input 4 button (49 dB to 51 dB of attenuation) is at least 2 dB less than the blinking Input 3 button (53 dB *minus* 51 dB) and at most 6 dB less (55 dB *minus* 49 dB).
- **Switchers with 32 input buttons** — 58 dB of attenuation when compared to the Input 3 button blinking (59 dB of attenuation). The blinking Input 4 button (57 dB of attenuation) is 2 dB less than the steadily-lit Input 2 button (59 dB *minus* 57 dB).

See the table on the previous page to read the volume display.

Example 10: Viewing and adjusting a local output volume level

In the following example, the audio output volume is viewed and adjusted. The steps show the front panel indications that result from your action.

NOTE Because of the different volume display schemes, the output volume levels that result from the following example are shown twice: as displayed on a 32-input button switcher and on a 16-input button switcher. The 32-button displays show the actions that led up to the display. For simplicity, the 16-button figures show the volume display only, not the actions that lead up to it.

1. Press and release the Esc button (figure 3-58).

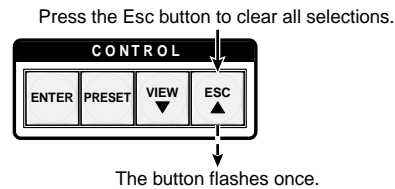


Figure 3-58 — Clear all selections

2. Press and **hold** the Audio button for approximately 2 seconds (figure 3-59).

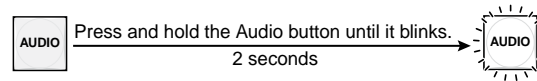


Figure 3-59 — Select Audio mode

3. Press and release the output 1 button (figure 3-60).

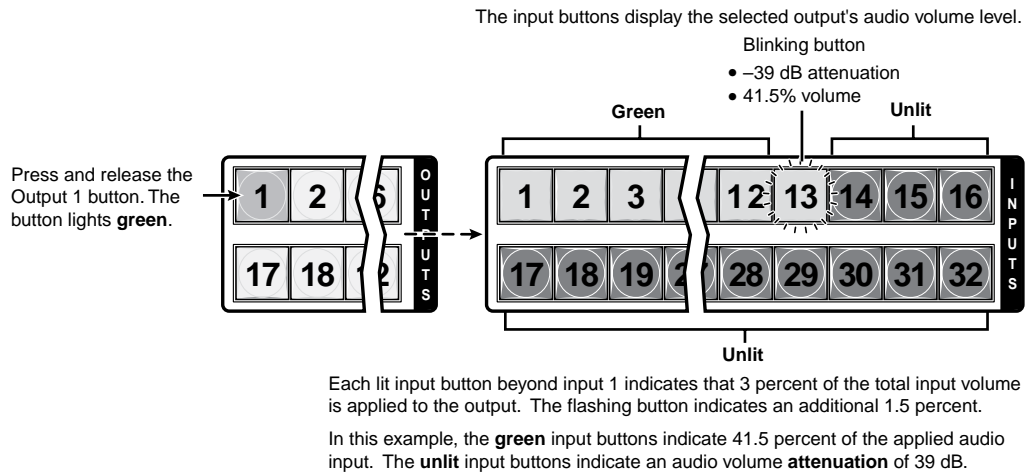
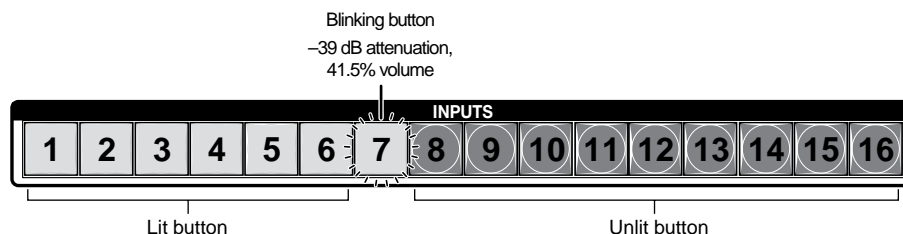


Figure 3-60 — Select output 1

Operation, cont'd

Figure 3-61 shows the same volume (41.5%) as in figure 3-61, but displayed on a 16-input-button switcher, such as an MTPX Plus 1616.



- The input LEDs display the selected output's audio volume level.
- In this example, the **lit/blinking** input buttons indicate 41.5 to 44.5 percent of the applied audio input.
- The **unlit/blinking** input buttons indicate an audio volume **attenuation** of 37 dB to 39 dB.

Figure 3-61 — Volume display on a 16-input-button switcher

NOTE Volume is protected when front panel Lock mode 2 is selected. You can view the volume in Lock mode 2 but you cannot change it from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-46.

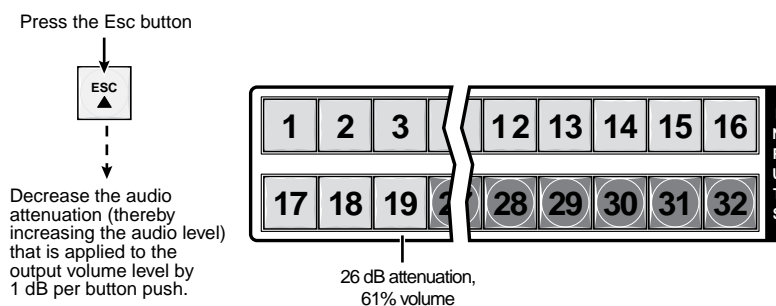
If front panel Lock mode 2 is selected and you try to perform step 4, the actions are ignored and the Enter, Video, and Audio buttons flash.

4. Press and release the Esc (▲) button once (figure 3-62) to increase the volume by 1.5%.

Press and release the Esc (▲) button several more times (figure 3-62) to increase the volume by 1.5% per button press. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.

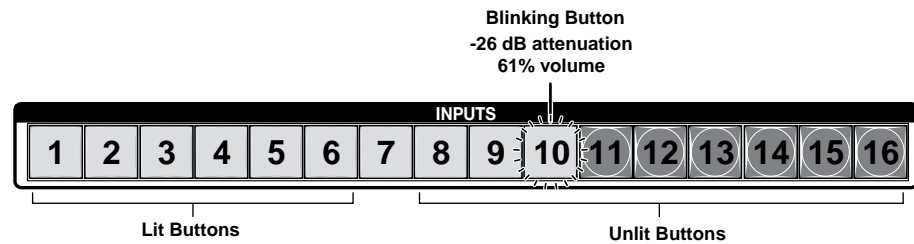
Figure 3-62 show the result of pressing the Esc (▲) button a total of 13 times.



- The input buttons display the selected output's audio volume level.
- Each lit input button beyond input 1 indicates that 3 percent of the total input volume is applied to the output.
- In this example, the **green** input buttons display 61 percent of the applied audio input.
- The **unlit** input buttons indicate an audio volume **attenuation** of 26 dB.

Figure 3-62 — Adjust the output audio volume

Figure 3-63 shows the same volume (61%) as in figure 3-62, but displayed on a 16-input-button switcher, such as an MTPX Plus 168.



- The input LEDs display the selected output's audio volume level.
- In this example, the **lit/blinking** input buttons indicate 59.5 to 62.5 percent of the applied audio input.
- The **unlit/blinking** input buttons indicate an audio volume **attenuation** of 25 dB to 27 dB.

Figure 3-63 — Volume display on a 16-input-button switcher

5. Press and release the Audio button (figure 3-64).

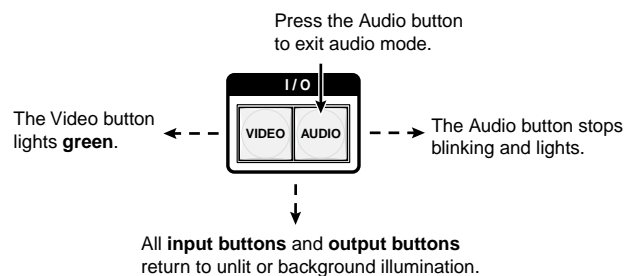


Figure 3-64 — Deselect Audio mode

Setting the front panel locks (*Executive modes*)

The matrix switcher has three levels of front panel security lock that limit the operation of the switcher from the front panel. The three levels are:

- **Lock mode 0** — The front panel is completely unlocked. All front panel functions are available.
- **Lock mode 1** — All changes are locked from the front panel (except for setting *Lock mode 2*). Some functions can be viewed.
- **Lock mode 2** — Basic functions are unlocked. Advanced features are locked and can be viewed only.

Basic functions consist of:

- Making ties
- Saving and recalling presets
- Setting input audio gain and attenuation
- Changing *Lock modes*

Advanced functions consist of:

- Creating I/O groups
- Setting audio output mutes
- Setting audio output volume
- Setting the rear panel remote port protocol and baud rate
- Setting the audio/RS-232 input format (audio or RS-232)

NOTE *The switcher is shipped from the factory in Lock mode 2.*

Selecting Lock mode 2 or toggling between mode 2 and mode 0

NOTE If the switcher is in Lock mode 0 or mode 1, this procedure selects mode 2.

If the switcher is in Lock mode 2, this procedure selects mode 0 (unlocks the switcher).

Toggle the lock on and off by pressing and holding the Enter button, the Video button, and the Audio button simultaneously for approximately 2 seconds (figure 3-65).

Press and **hold** the Enter, Video, and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 2 and mode 0.

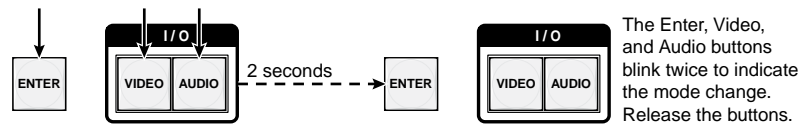


Figure 3-65 — Toggle front panel lock between mode 2 and mode 0

Selecting Lock mode 2 or toggling between mode 2 and mode 1

NOTE If the switcher is in Lock mode 0 or mode 1, this procedure selects mode 2.

If the switcher is in Lock mode 2, this procedure selects mode 1.

Toggle the lock on and off by pressing and holding the Video button and the Audio button simultaneously for approximately 2 seconds (figure 3-66).

Press and **hold** the Video and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 1 and mode 2.

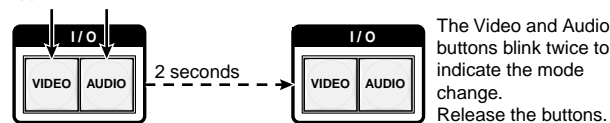


Figure 3-66 — Toggle front panel lock between mode 2 and mode 1

Performing a system reset from the front panel

The front panel reset is identical to issuing the **[Esc]ZXXX←** SIS command (see chapter 4, “Programmer’s Guide”). A system reset performs the following functions:

- Clears all ties and presets
- Clears all audio or RS-232 mutes
- Resets all I/O grouping
- Resets all input level/peaking to zero
- Resets all input and output skew adjustments to zero.
- Resets all output pre-peaking to off
- Disables all RS-232 output inserts
- Sets all audio/RS-232 wire pair inputs to audio
- Resets all input audio levels to unity gain (0 dB)
- Sets all output volume levels to 100% (0 dB of attenuation)

NOTE *The system reset clears most image and audio adjustments. If you want to save these settings, use the Windows-based Matrix Switchers Control Program and the **File > Save MATRIX settings as...** selection before you perform this reset (See chapter 5, “Matrix Software”).*

Reset the switcher to the factory default settings by pressing and **holding** the Video button and Audio button simultaneously **while** you apply AC power to the switcher (figure 3-67).

NOTE *System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.*

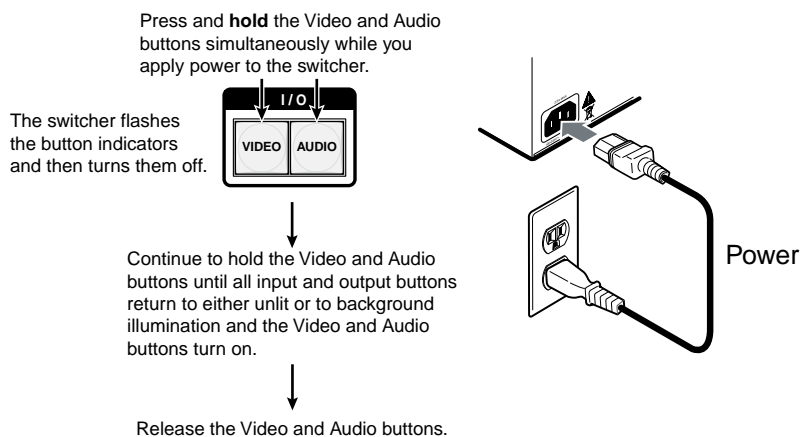
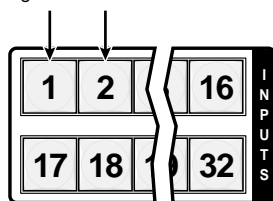


Figure 3-67 — System reset

Background illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off. To toggle the background illumination on or off, press and hold the Input 1 and Input 2 buttons simultaneously for approximately 2 seconds (figure 3-68).

Press and **hold** the Input 1 and Input 2 buttons simultaneously to toggle background illumination mode on or off.



After approximately 2 seconds, release the Input 1 and Input 2 buttons.

Figure 3-68 — Toggle background illumination on or off

Defining the audio/RS-232 wire pair

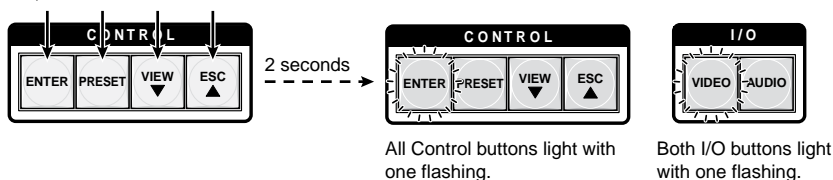
NOTE The TP audio/RS-232 input wire pair configurations are protected when front panel Lock mode 2 is selected. You can view the configurations in Lock mode 2 but you cannot adjust them from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-46.

The switcher is compatible with MTPs that transmit and receive mono audio and those that transmit and receive RS-232 serial data. You must configure the switcher for the appropriate audio/RS-232 input for each TP input. Each TP input’s audio/RS-232 settings can be viewed and changed from the front panel.

View and configure the switcher’s TP input audio/RS-232 configuration settings as follows:

1. To enter *Serial Port and Audio/RS-232 Input Configuration mode*, simultaneously press and **hold all** Control buttons (Enter, Preset, View, and Esc) (figure 3-69).

Press and **hold** the Enter, Preset, View, and Esc buttons.



NOTE The Control and I/O buttons indicate the baud rate and protocol. See “Selecting the rear panel Remote port protocol and baud rate”, later in this chapter.

Unlit input buttons indicate that the input’s audio/RS-232 twisted wire pair is configured as audio. Red input buttons indicate that the input’s audio/RS-232 twisted wire pair is configured as RS-232.

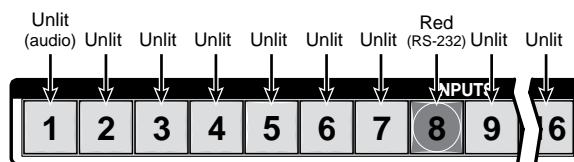


Figure 3-69 — Audio/RS-232 display

2. Release the Control buttons.

NOTE If front panel Lock mode 2 is selected and you try to perform step 3, the actions are ignored and the Enter, Video, and Audio buttons flash. See “Setting the front panel Locks (Executive modes)” on page 3-46.

Operation, cont'd

3. To change an input's audio/RS-232 wire pair configuration, press and release the input button to toggle that input's configuration (figure 3-70).

Press and release the Input 8 button to toggle the configuration of input 8's audio/RS-232 wire pair (to audio, in this example).

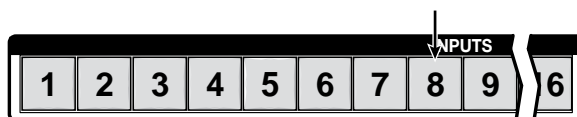


Figure 3-70 — Audio/RS-232 selection

4. Press and release an output button to exit the *Serial Port and Audio/RS-232 Input Configuration* mode (figure 3-71).

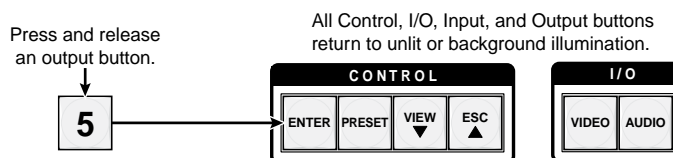


Figure 3-71 — Exit Serial Port and Audio/RS-232 Input Configuration mode

Selecting the rear panel Remote port protocol and baud rate

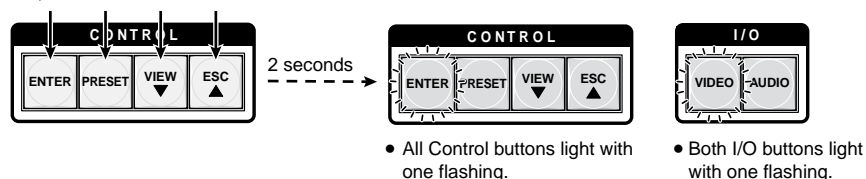
NOTE The Remote port settings are protected when front panel Lock mode 2 is selected. You can view the settings in Lock mode 2 but you cannot adjust them from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-46.

The switcher can support either RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, and 115200 baud rates. The settings of these variables can be viewed and changed from the front panel.

View and configure the switcher's serial communications settings as follows:

1. To enter *Serial Port and Audio/RS-232 Input Configuration* mode, simultaneously press and **hold** all Control buttons (Enter, Preset, View, and Esc) (figure 3-72).

Press and **hold** the Enter, Preset, View, and Esc buttons.



NOTE The Input buttons indicate the configuration of the secondary wire pairs. See "Selecting the TP wire pair secondary input", earlier in this chapter.

The flashing Control button indicates the **baud rate** as follows:
Enter — 9600 Preset — 19200
View — 38400 Esc — 115200

The flashing I/O button indicates the **protocol** as follows:
Video — RS-232 Audio — RS-422/RS-485

In this example, the port is set to RS-232 at 9600 baud.

Figure 3-72 — RS-232/RS-422 and baud rate display

2. Release the Control buttons.

NOTE *If front panel Lock mode 2 is selected and you try to perform step 3, the actions are ignored and the Enter, Video, and Audio buttons flash. See “Setting the front panel Locks (Executive modes)” on page 3-46.*

3. **To change a value**, press and release the button that relates to the desired value (figure 3-73).

Press and release the button(s) to configure the port as follows:

Baud rate:

Enter — 9600

Preset — 19200

View — 38400

Esc — 115200

Serial protocol:

Video — RS-232

Audio — RS-422/RS-485

The selected buttons blink and the others remain lit.

In this example, the port is set to RS-422 at 38400 baud.

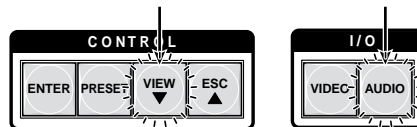


Figure 3-73 — RS-232/RS-422 and baud rate selection

4. Press and release an output button to exit the *Serial Port and Audio/RS-232 Input Configuration* mode (figure 3-74).

Press and release an output button.

All Control and I/O buttons return to unlit or background illumination.

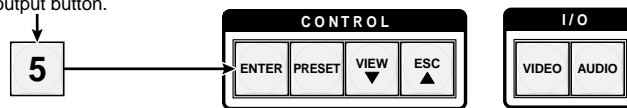


Figure 3-74 — Exit Serial Port and Audio/RS-232 Input Configuration mode

Rear Panel Operations

The rear panel has a Reset button that initiates four levels of resets (numbered 1, 3, 4, and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or Extron Tweaker to access it.

See the table on the next page for a summary of the modes.

CAUTION *Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.*

NOTE *The reset modes listed on the next page close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from Mode 1 to Mode 5.*

Operation, cont'd

Reset Mode Comparison/Summary			
Mode	Activation	Result	Purpose/Notes
1	<p>Hold down the recessed Reset button while applying power to the switcher.</p> <p>NOTE After a mode 1 reset is performed, update the switcher's firmware to the latest version. Do not operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again. See chapter 5, "Matrix Software", for details on uploading firmware.</p>	<p>The switcher reverts to the factory default firmware. Event scripting will not start if the switcher is powered on in this mode. All user files and settings (drivers, adjustments, IP settings, etc) are maintained.</p> <p>NOTE If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the 0Q SIS command to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number).</p>	Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
3	Hold down the Reset button for about 3 seconds, until the Reset LED blinks once, then press Reset momentarily (<1 second) within 1 second.	Mode 3 turns events on or off. During resetting, the Reset LED flashes 2 times if events are starting, 3 times if events are stopping.	Mode 3 is useful for troubleshooting.
4	Hold down the Reset button for about 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then press Reset momentarily (<1 second) within 1 second.	<p>Mode 4:</p> <ul style="list-style-type: none"> Enables ARP capability. Sets the IP address to the factory default. Sets the subnet address to the factory default. Sets the gateway address to the factory default. Sets port mapping to the factory default. Turns DHCP off. Turn events off. <p>The Reset LED flashes four times in quick succession during the reset.</p>	Mode 4 enables you to set IP address information using ARP and the MAC address.
5	<p>Hold down the Reset button for about 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then press Reset momentarily (<1 second) within 1 second.</p> <p>NOTE Mode 5 reset clears most adjustments. To save these settings, use the Windows-based Matrix Switchers Control Program and the File > Save MATRIX settings as... selection before you perform this reset (See chapter 5, "Matrix Software").</p>	<p>Mode 5 performs a complete reset to factory defaults (with the exception of the firmware):</p> <ul style="list-style-type: none"> Does everything mode 4 does. Resets most all real time adjustments, including: <ul style="list-style-type: none"> clears all ties and presets, clears all audio or RS-232 mutes, clears all I/O grouping, clears all input level/peaking, clears all skew adjustments, clears all output pre-peaking, disables all RS-232 output inserts, sets all audio/RS-232 wire pairs to audio, and clears all audio settings. Resets all IP options. Removes/clears all files for the switcher. <p>The reset LED flashes four times in quick succession during the reset.</p>	Mode 5 is useful if you want to start over with configuration and uploading or to replace events.

For different reset levels, press and hold the button while the switcher is running or press and hold the button while you apply power to the switcher.

Performing a hard reset (reset 1)

The hard reset function restores the switcher to the base firmware that it was shipped with. After a hard reset, events do not automatically start, but user settings and files are restored.

Perform a hard reset as follows:

NOTE *The hard reset restores the factory-installed firmware. The switcher reverts to that factory firmware the next time power is cycled off and on unless a firmware update is performed before the power cycle.*

1. If necessary, turn off power to the switcher.
2. Press and **hold** the Reset button on the rear panel **while** you apply AC power to the switcher (figure 3-75).

Press and **hold** the Reset button while you apply power to the switcher.



The switcher flashes the front panel button indicators **green**, **red**, and **amber** and then turns them off.



Continue to hold the Reset button until all input and output buttons return to either unlit or to background illumination and the Video and Audio buttons turn on.



Release the Reset button.

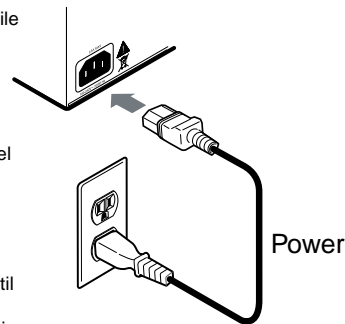


Figure 3-75 — Hard reset

Performing soft system resets (resets 3, 4, and 5)

Perform a soft reset of the switcher as follows:

1. Use an Extron Tweezer or other small screwdriver to press and **hold** the rear panel Reset button until the front panel Video and Audio buttons blink the number of times for the desired reset: once (events reset), twice (system reset), or three times (absolute reset) (figure 3-76).

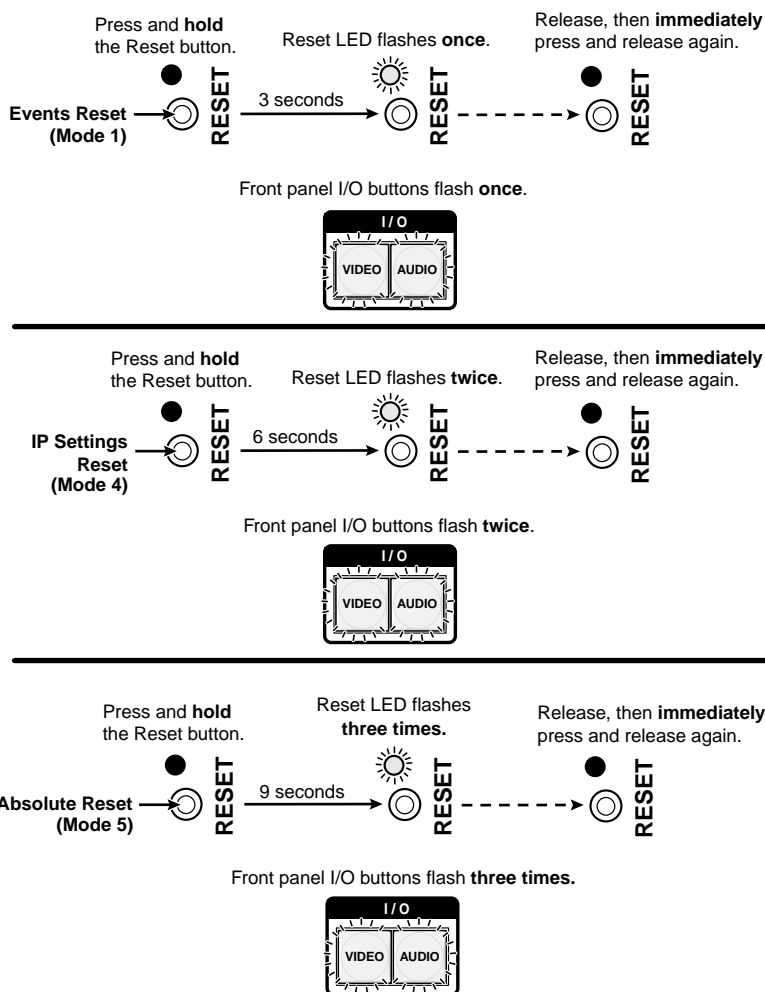


Figure 3-76 — Soft system resets

2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

Optimizing the Audio

Each local input's audio level can be adjusted within a range of -18 dB to +24 dB, so there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. Each local audio output's volume can be adjusted from full loudness to effectively muted. Adjust the levels as follows:

1. Connect audio sources to all desired inputs and connect the local audio outputs to output devices such as audio players. See "Signal inputs", in chapter 2, "Installation". For best results, wire all of the inputs and the outputs balanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see "Creating a configuration", in this chapter), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the input audio level of each input (see "Viewing and adjusting the TP input audio level", on page 3-34) so that the approximate output level is the same for all selected inputs.
5. Tie an audio input to each local audio output.
6. As necessary, adjust the output audio level of each output (see "Viewing and adjusting the local output volume", on page 3-40).

Video Adjustments

Image adjustments are available via SIS commands, the Windows-based control program, and the built-in HTML pages. See "Optimizing the Video", in chapter 5, "Matrix Software".

Troubleshooting

This section gives recommendations on what to do if you have problems operating the switcher.

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if one of the front panel Power Supply LEDs is lit green.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S³ Sales & Technical Support Hotline if necessary. See the rear cover of this manual for the phone number in your region of the world.

Operation, cont'd

Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-59 (32-input button and -output button switchers) and page 3-61 (16-button switchers) and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio.

NOTE All of the equipment in the following examples is connected through the appropriate MTP transmitter or receiver.

Worksheet example 1: System equipment

Figure 3-77 shows a portion of a worksheet for an MTPX Plus 1616 in a fictional organization with the system hardware annotated. Inputs 10, 11, and 13 have no connection in this organization, so they are crossed out on the worksheet. Similarly, outputs 7 and 9 through 16 are crossed out.

Input sources												
Camera/ mic - Main podium	Camera #2	PC 1 RGB 202	PC 2 RGB 202	Audio CD	Classroom #1 VCR USP 405	Classroom #2 VCR USP 405	Laptop RGB 202	Rack DVD (USP 405)	X	X	VTG 300	X
1	2	3	4	5	6	7	8	9	10	11	12	13

1	2	3	4	5	6	7	8	9	10	11
Main hall FP #1	Main hall FP #2	Podium monitor	Sound system #1	Sound system #2	VCR (VSC 500)	X	DA 6	X	X	X

Output destinations

Preset # 3 Title: Weekly status mtg Video: Audio:

Fill in the preset number and use colors, dashes, etc., to make connecting lines.
Indicate if the configuration is for video, audio, or both.

Figure 3-77 — Worksheet example 1: System equipment

Inputs include PCs, an audio CD player, cameras, and an Extron VTG 300. Output devices include monitors, projectors, a stereo, and a VCR for recording presentations.

The VTG 300 video test generator connected to input 12 enables a video test pattern to be sent to one, several, or all output devices for problem isolation or adjustment purposes. An audio test tape or CD could be used in a similar manner to check out the audio components.

Worksheet example 2: Daily configuration

Figure 3-78 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1. Solid lines shows video ties and dashed lines show the audio ties.

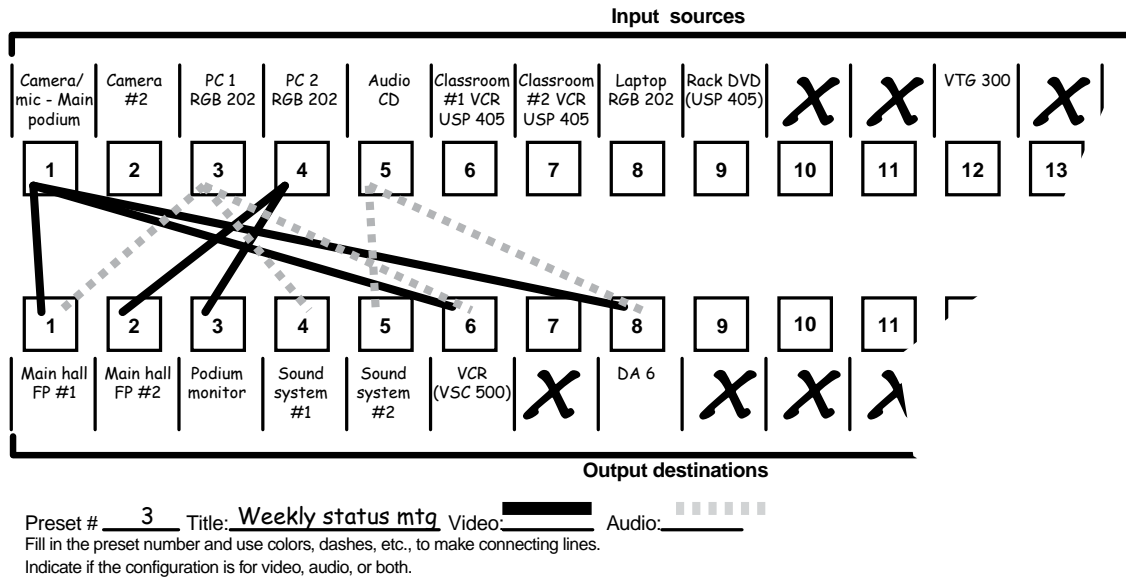


Figure 3-78 — Worksheet example 2: Daily configuration

In this example:

- The image of the presenter, from the main podium camera (input 1), is:
 - Displayed in the main hall (output 1)
 - Displayed in the lobby via a distribution amplifier (output 8)
 - Tied to the VCR (output 6)
- The presenter has a presentation on her laptop computer (input 4) that is:
 - Displayed in the main hall (output 2)
 - Displayed locally on the podium (output 3)
- The audio from the presenter's microphone (input 3) is:
 - Played in the hall (output 1)
 - Played in the conference room (output 4)
 - Sent to the VCR (output 6)
- Classical music from the CD player (input 5) is:
 - Played in the background in the main hall on sound system #2 (output 5)
 - Played in the lobby via a distribution amplifier (output 8)

Operation, cont'd

Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-79 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all monitors (outputs 1, 2, 3, and 8). Sound checks are run from the CD player (input 5) to all audio systems (outputs 1, 2, 4, 5, and 8).

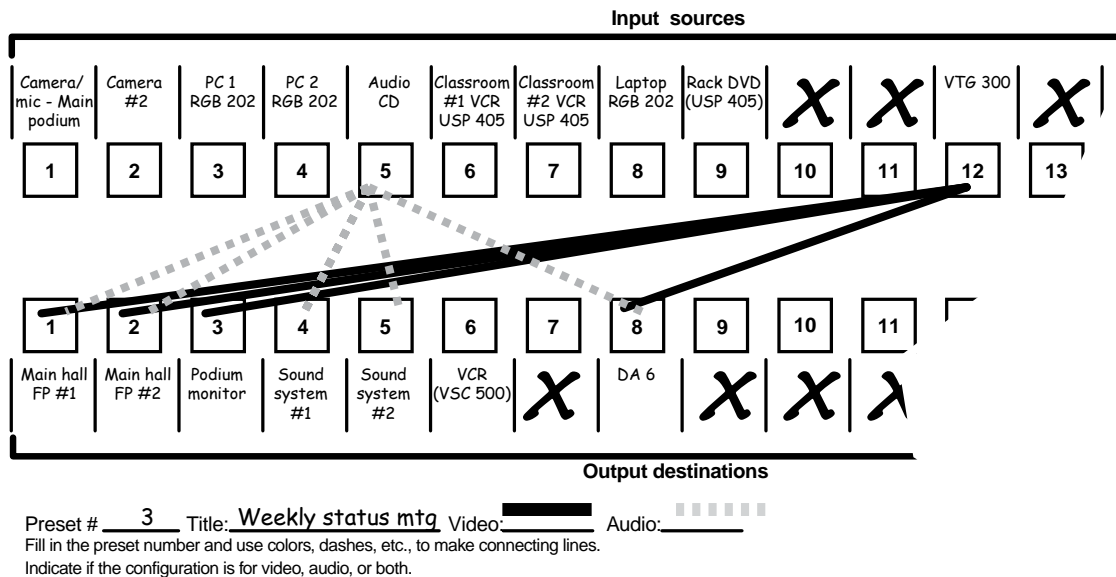


Figure 3-79 — Worksheet example 3: Test configuration

Input sources

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Output destinations

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Preset # _____ Title: _____ Video: _____ Audio: _____
 Fill in the preset number and use colors, or dashes, etc. to make connecting lines.
 Indicate if the configuration is for Video, Audio, or both.

32-button switchers configuration worksheet

Operation, cont'd

Operation, cont'd



MTPX Plus Twisted Pair Matrix Switchers

4 **Chapter Four**

Programmer's Guide

Serial Ports

Ethernet (LAN) Port

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Tables

Command/Response Table for SIS Commands

Command Response Table for IP-specific SIS Commands

Special Characters

Programmer's Guide

Serial Ports

The switcher has two serial ports that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the switcher possible. The serial ports are:

- The rear panel Remote (RS-232 or RS-422) port, a 9-pin D female connector
- The front panel Configuration (RS-232) port, a 2.5 mm mini stereo jack

The default protocol for both ports is as follows:

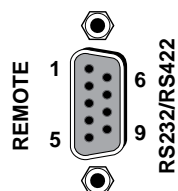
- 9600 baud
- no parity
- 8-bit
- 1 stop bit
- no flow control

The ports can be configured to operate at the 9600, 19200, 38400, or 115200 baud rate.

NOTE These two ports are independent of one another. A front panel Configuration port connection and a rear panel Remote port connection can be active at the same time.

NOTE The switcher can operate at 9600, 19200, 38400, or 115200 baud rates, but Extron recommends leaving these ports at 9600 baud only.

Rear panel Remote port



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX-	Transmit data (-)
3	RX	Receive data	RX-	Receive data (-)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Figure 4-1 — Remote connector pin assignments

NOTE The rear panel Remote port can support either RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, or 115200 baud rates. See “Selecting the rear panel Remote port protocol and baud rate” in chapter 3, “Operation”, to configure the rear panel Remote port from the front panel.

Front panel Configuration port

NOTE This port is hardwired for RS-232 only.

The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part #70-335-01 (figure 4-2) can be used for connection to the Configuration port.

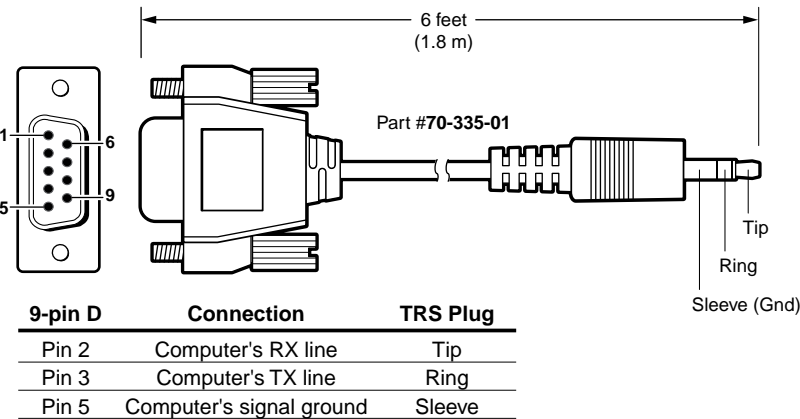


Figure 4-2 — Optional 9-pin TRS RS-232 cable

NOTE This port is independent of the rear panel Remote port and is not affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed via SIS command control only. See the Command/Response table for IP SIS commands, later in this chapter, to configure both ports under SIS control.

Ethernet (LAN) Port

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. Communications between the switcher and the controlling device is via telnet (a TCP socket using port 23). The TCP port can be changed if necessary. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN. The SIS commands and actions of the switcher are identical to the commands and actions the switcher has when communicating to it via RS-232.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 4-3).

- **Crossover cable** — Direct connection between the computer and the MTPX Plus switcher.
- **Patch (straight-through) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN.

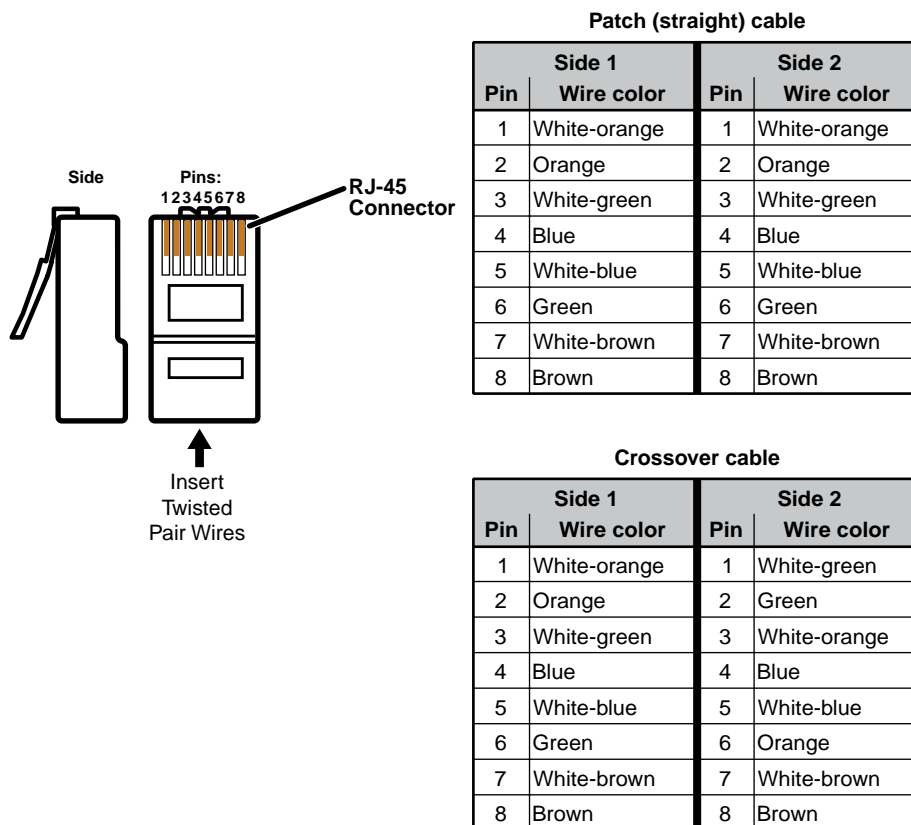


Figure 4-3 — RJ-45 Ethernet connector pin assignments

Default IP addresses

To access the MTPX Plus switcher via the LAN port, you need the unit's IP address, and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping (ICMP) utility (see appendix A, "Ethernet Connection", for more details). If the addresses have not been changed, the factory-specified defaults are:

- IP address 192.168.254.254 • Subnet mask 255.255.0.0
- Gateway address 0.0.0.0

Establishing a connection

Establish a network connection to an MTPX Plus switcher as follows:

1. Open a TCP socket to port 23 using the switcher's IP address.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

The switcher responds with a copyright message including the date, the name of the product, firmware version, part number, and the current date/time.

NOTE *If the switcher is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.*

NOTE *If the switcher is password-protected, a password prompt appears below the copyright message.*

2. If the switcher is password protected, enter the appropriate administrator or user password.

If the password is accepted, the switcher responds with *Login User* or *Login Administrator*.

If the password is not accepted, the *Password* prompt reappears.

Connection timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is set to five minutes but the value can be changed. See the *Configure port timeout* SIS commands on page 4-26.

NOTE *Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.*

Number of connections

An MTPX Plus switcher can have up to 200 simultaneous TCP connections, including all http sockets and telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed. No error message or indication is given that the connection limit has been reached. To maximize performance of an IP Link device, the number of connections should stay low and unnecessary open sockets should be closed.

Using Verbose Mode

Telnet connections to an MTPX Plus switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other telnet sockets or a serial port. For a telnet session to receive change notices from the switcher, the telnet session must be in verbose mode 3. See the Verbose Mode SIS command on page 4-26. In verbose mode 3, the telnet socket reports changes in messages that resemble SIS command responses.

Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through either serial port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = **↵**), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

When a local event such as a front panel operation occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

(c) Copyright 2008, Extron Electronics MTPX, Vx.xx, 60-*nnn*-01 {day,

date, time}↵

The switcher initiates the copyright message when it is first powered on or when connection via Internet protocol (IP) is established. Vx.xx is the firmware version number and 60-*nnn*-01 is the switcher part number.

NOTE {Day, date, time} are only reported if the connection is via the LAN port.

↵Password:

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or Telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator↵

↵Login User↵

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Qik↵

The switcher initiates the Qik message when a front panel switching operation has occurred.

Spr*nn*↵

The switcher initiates the Spr message when a memory preset has been saved from the front panel. *nn* is the preset number.

Rpr*nn*↵

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel. *nn* is the preset number.

Innn Audxx←

The switcher initiates the Aud message when a front panel input audio level change has occurred. *nn* is the input number and *xx* is the dB level.

Outnn Volxx←

The switcher initiates the Vol message when a front panel output audio volume change has occurred. *nn* is the output number and *xx* is the volume level.

Amtnn*x←

The switcher initiates the Amt message when an audio or RS-232 output mute is toggled on or off from the front panel. *nn* is the output number and *x* is the mute status: 1 = on, 0 = off.

Exen←

The switcher initiates the Exe message when executive mode is toggled on or off from the front panel. *n* is the executive mode: 0, 1, or 2.

Switcher Error Responses

When the switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

- E01 — Invalid input channel number (too large)
- E10 — Invalid command
- E11 — Invalid preset number
- E12 — Invalid output number (too large)
- E13 — Invalid value (out of range)
- E14 — Illegal command for this configuration
- E17 — Timeout (caused only by direct write of global presets)
- E21 — Invalid room number
- E22 — Busy
- E24 — Privileges violation (Users have access to all view and read commands (other than the administrator password), and can create ties, presets, and audio or RS-232 mutes)
- E25 — Device not present
- E26 — Maximum number of connections exceeded
- E27 — Invalid event number
- E28 — Bad filename / file not found

Programmer's Guide, cont'd

Using the Command/Response Tables

The command/response tables begin on page 4-10. Lower-case letters are acceptable in the command field except where indicated for the gain and attenuation commands. The table below shows the hexadecimal equivalent of each ASCII character used in the command/response table.

ASCII to HEX Conversion Table																Esc 1B	CR 0D	LF 0A
Space 20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27	(28)	29
*	2A	+	2B	,	2C	-	2D	.	2E	/	2F							
0 30	1 31	2 32	3 33	4 34	5 35	6 36	7 37											
8 38	9 39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F					
@ 40	A 41	B 42	C 43	D 44	E 45	F 46	G 47											
H 48	I 49	J 4A	K 4B	L 4C	M 4D	N 4E	O 4F											
P 50	Q 51	R 52	S 53	T 54	U 55	V 56	W 57											
X 58	Y 59	Z 5A	[5B	\ 5C] 5D	^ 5E	_ 5F											
` 60	a 61	b 62	c 63	d 64	e 65	f 66	g 67											
h 68	i 69	j 6A	k 6B	l 6C	m 6D	n 6E	o 6F											
p 70	q 71	r 72	s 73	t 74	u 75	v 76	w 77											
x 78	y 79	z 7A	{ 7B	7C	}	7D	~ 7E	DEL 7F										

Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table.

Command/Response Table for SIS Commands

Symbol definitions

↵ = CR/LF (carriage return/line feed, hex 0D 0A)

← = Carriage return (no line feed, hex 0D))

• = Space character

Esc = Escape key (hex 1B)

X1 = Input number (for tie)

00 – 32 (00 = untied)

X2 = Output number

01 – 32

X3 = Input number

01 – 32

X4 = Audio/RS-232 wire pair input type

0 = audio
1 = RS-232

X5 = RS-232 output insert port

MTPX Plus 168, 816, 1616 01 – 08
MTPX Plus 1632, 3216, 3232 01 – 16

X6 = RS-232 output insert status

0 = disabled
1 = enabled

X7 = Input signal level/peaking range

000 – 255

X8 = Threshold

0 = outside of threshold
1 = within threshold

X9 = Skew adjustment range

00 – 31 (each step = 2ns)

X10 = Video plane

0 = red
1 = green
2 = blue

X11 = Pre-peakable output number

MTPX Plus 168 01 – 04
MTPX Plus 816, 1616, 3216 01 – 08
MTPX Plus 1632, 3232 01 – 16

X12 = Mute, pre-peaking, Lock mode, power supply

0 = off/mode 0/not OK
1 = on/mode 1/OK
2 = mode 2

X13 = Local video output number

1 or 2

NOTE **X13** is applicable to matrix sizes 1632 and larger only.

X14 = Local output sync polarity	0 = H- / V- (default) 1 = H+ / V- 2 = H- / V+ 3 = H+ / V+ 4 = No sync stripping (composite, S-video, YUV)
X15 = Local audio output number	1 – 4 (matrix sizes 1616 and smaller) 1 – 8 (matrix sizes 1632 and larger)
X16 = Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 22 dB) (default = 64 [0 dB]) (See the table on page 4-14.)
X17 = Audio gain	0 – 24 (1 dB/step)
X18 = Numeric dB value	–18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
X19 = Audio attenuation	1 – 18 (1 dB/step)
X20 = Global or room preset #	0 – 32, 10 maximum for a room preset (0 = current configuration)
NOTE A Room preset is a stored configuration with all of the outputs assigned to a single room . When a room preset is retrieved from memory, it becomes the current configuration.	
X21 = Name	12 characters maximum for input, output, and global preset names Upper- and lower-case alphanumeric characters and _ / and spaces are valid.
NOTE The following characters are invalid in the name: {space} ~ , @ = ' [] { } < > ' " ; : \ and ?.	
X22 = Room # (for room presets)	10 max. (each can have up to 10 presets (X20 s) assigned)
NOTE A Room is a subset of operator-selected outputs that relate to each other. The MTPX Plus switchers support up to 10 rooms , each of which can consist of from 1 to 16 outputs.	
X23 = Group # (for I/O grouping)	1 through 4 groups (0 = no group)
X24 = Audio or RS-232 mute:	0 = no mutes 2 = audio or RS-232 mute
X25 = Local input select DIP switch status	0 = RJ-45 position, 1 = local input position
X26 = Number of inputs	8, 16, or 32
X27 = Number of outputs	8, 16, or 32
X28 = Part number	60- <i>nnn-<i>nn</i></i>
X29 = Firmware version number to second decimal place (<i>x.xx</i>)	
X30 = Verbose firmware version-description-upload date/time. See the Query firmware version (verbose) command on page 4-22.	
X31 = Voltage	Positive or negative voltage and magnitude
X32 = Internal temperature	Degrees Fahrenheit
X33 = Fan speed	RPM

Programmer's Guide, cont'd

Command/response table for SIS commands

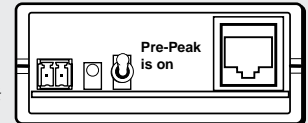
Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Create ties			
NOTE • Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!02*02&003*003%4*8\$. • The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously. • The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1, 02*02, or 001*001). NOTE The & tie command for RGB and the % tie command for video can be used interchangeably on the matrix switchers.			
Tie input X1 to output X2 , video (V) and audio (A) <i>Example:</i>	X1 * X2 ! 1*3!	Out X2 •In X1 •All↵ Out03•In01•All↵	Tie input X1 's video and audio to output X2 . Tie input 1 video and audio to output 3.
Tie input X1 to output X2 , RGB (video) only <i>Example</i> (see 2nd Note, above):	X1 * X2 & 10*4&	Out X2 •In X1 •RGB↵ Out04•In10•RGB↵	Audio breakaway. Tie input 10 RGB to output 4.
Tie input X1 to output X2 , video only <i>Example</i> (see 2nd Note, above):	X1 * X2 % 7*5%	Out X2 •In X1 •Vid↵ Out05•In07•Vid↵	Audio breakaway. Tie input 7 video to output 5.
Tie input X1 to output X2 , audio only <i>Example:</i>	X1 * X2 \$ 12*4\$	Out X2 •In X1 •Aud↵ Out04•In12•Aud↵	Audio breakaway. Tie input 12 audio to output 4.
Quick multiple tie <i>Example:</i>	Esc +Q X1 * X2 !... X1 * X2 \$↵ Esc +Q3*4!3*5%3*6\$↵	Qik↵ Qik↵	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.
Tie input to all outputs, video and audio <i>Example:</i>	X1 *! 5*!	In X1 •All↵ In05•All↵	Tie input 5 video and audio to all outputs.
Tie input to all outputs, RGB (video) only <i>Example</i> (see 2nd Note, above):	X1 *& 8*&	In X1 •RGB↵ In08•RGB↵	Audio breakaway. Tie input 8 RGB to all outputs.
Tie input to all outputs, video only <i>Example</i> (see 2nd Note, above):	X1 *% 10*%	In X1 •Vid↵ In10•Vid↵	Audio breakaway. Tie input 10 video to all outputs.
Tie input to all outputs, audio only	X1 *\$	In X1 •Aud↵	Audio breakaway.
Read ties			
NOTE The & read tie command for RGB and the % read tie command for video can be used interchangeably on the matrix switchers.			
Read RGB (video) output tie	X2 &	X1 ↵	RGB input X1 is tied to output X2 .
Read video output tie	X2 %	X1 ↵	Video input X1 is tied to output X2 .
Read audio output tie	X2 \$	X1 ↵	Audio input X1 is tied to output X2 .

NOTE **X1** = Input number
X2 = Output number

00 – (maximum number of inputs for your model) (00 = untied)
 01 – (maximum number of outputs for your model)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio/RS-232 TP input (wire pair 3 and 6) configuration			
NOTE The RS-232 output insert ports, when enabled (Esc X5 *1Lrpt←), override the audio/RS-232 TP input configurations.			
Configure input as audio	X3 *0\	Typ X3 *0←	Define the audio/RS-232 input as audio, such as provided by an MTP 15HD A transmitter.
Configure input as RS-232	X3 *1\	Typ X3 *1←	Define the audio/RS-232 input as serial communications, such as provided by an MTP 15HD RS transmitter.
Read TP input configuration	X3 \	X4 ←	Show the audio/RS-232 wire pair input definition.
RS-232 output inserts enables			
Disable an RS-232 output insert port	Esc X5 *0Lrpt←	Lrpt X5 *0←	Disable the RS-232 insert on the X5 output.
Enable an RS-232 output insert port	Esc X5 *1Lrpt←	Lrpt X5 *1←	Enable the RS-232 insert on the X5 output.
Read RS-232 output insert status	Esc X5 Lrpt←	X6 ←	Show the status of the RS-232 output insert.
Input signal level/peaking and auto calibrate			
Set input signal level	Esc X3 X7 Ipek←	Ipek X3 * X7 ←	Set a specific pre-peak level for the TP input.
Increment input peaking	Esc X3 +Ipek←	Ipek X3 * X7 ←	Increase the input pre-peaking level by 1.
Decrement input peaking	Esc X3 -Ipek←	Ipek X3 * X7 ←	Decrease the pre-peaking level by 1.
Read input peaking setting	Esc X3 Ipek←	X7 ←	
Execute auto calibration	Esc X3 *0AADJ←	Aadj X3 *2← {start} Qik← {tie creation} Aadj X3 * X8 ← {finished} Ipek X3 * X7 ← {new value}	Tie input X3 to output 1 and auto adjust the peaking on input X3 . The X8 value in the response reports whether the adjustment value was within or outside of the threshold.
NOTE Before issuing the auto calibration command:			
<ol style="list-style-type: none"> 1. Disconnect the power and RJ-45 cables at the MTP transmitter connected to X3. 2. Connect the two cables to the included MTP signal generator. 3. If the input cable is longer than 300' (90 m), place the MTP signal generator's Pre-Peak switch on (up when the signal generator's RJ-45 connector is to the right as shown at right). If the cable is shorter than 300' (90 m), place the switch down. 			



NOTE **X3** = Input number
X4 = Audio/RS-232 wire pair input type
X5 = RS-232 output insert port
X6 = RS-232 output insert status
X7 = Input signal level/peaking range
X8 = Threshold

01 – (maximum number of inputs for your model)
0 = audio
1 = RS-232
MTPX Plus 168, 816, 1616 01 – 08
MTPX Plus 1632, 3216, 3232 01 – 16
0 = disabled
1 = enabled
000 – 255
0 = outside of threshold
1 = within threshold

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Input skew adjustment			
Set all input skew adjustment values	Esc X3 * X9 * X9 * X9 Iseq ←	Iseq X3 * X9 * X9 * X9 ↵	Set a specific skew adjustment for the TP input. X9 values are listed in RGB order.
<i>Example:</i>	Esc 2*0*0*4Iseq ←	Iseq02*00*00*04↵	Set input 2's skew settings as follows: Red = 0 ns Green = 0 ns Blue = 8 ns (delayed 8 ns).
Increment one input skew adjustment value	Esc X3 * X10 +Iseq ←	Iseq X3 * X9 * X9 * X9 ↵	Increase input X3 's X10 plane's skew adjustment by 1 step (2 ns).
<i>Example:</i>	Esc 2*2*+Iseq ←	Iseq02*00*00*05↵	Increase input 2's blue skew by 2 ns to 10 ns.
Decrement one input skew adjustment value	Esc X3 * X10 -Iseq ←	Iseq X3 * X9 * X9 * X9 ↵	Decrease input X3 's X10 plane's skew adjustment by 1 step (2 ns).
Read input skew adjustment values	Esc X3 Iseq ←	X9 * X9 * X9 ↵	
Output pre-peaking			
Set output pre-peaking on	Esc X11 *1Opek ←	Opek X11 *1↵	Pre-peak the TP output.
Set output pre-peaking off	Esc X11 *0Opek ←	Opek X11 *0↵	Do not pre-peak the TP output.
Read output pre-peaking setting	Esc X11 Opek ←	X12 ↵	

NOTE	X3 = Input number	01 – (maximum number of inputs for your model)
	X7 = Input signal level/peaking range	000 – 255
	X9 = Skew adjustment range	00 – 31 (each step = 2ns)
	X10 = Video plane	0 = red 1 = green 2 = blue
	X11 = Pre-peakable output number	MTPX Plus 168 01 – 04 MTPX Plus 816, 1616, 3216 01 – 08 MTPX Plus 1632, 3232 01 – 16
	X12 = Pre-peaking	0 = off 1 = on

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Local video output sync polarity			
NOTE The command structure differs, depending on the size of the matrix. Matrix sizes 1616 and smaller do not need the local output variable (X13). Matrix sizes 1632 and larger require the variable.			
Set local output polarity (matrix size 1616 and smaller) <i>Example:</i>	Esc X14 Opol← Esc 0Opol←	Opol X14 ← Opol00←	Set the horizontal and vertical sync polarity for a local output. Set the local output to output negative horizontal and vertical sync.
Set local output polarity (matrix size 1632 and larger) <i>Example:</i>	Esc X13 * X14 Opol← Esc 2*0Opol←	Opol X13 * X14 ← Opol2*0←	Set the horizontal and vertical sync polarity for local output X13 . Set local output 2 to output negative horizontal and vertical sync.
Read local output sync settings (matrix size 1616 and smaller)	Esc Opol←	X14 ←	
Read local output sync settings (matrix size 1632 and larger)	Esc X13 Opol←	X14 ←	
Output skew adjustment			
Set all output skew adjustment values <i>Example:</i>	Esc X2 * X9 * X9 * X9 Oseq← Esc 2*0*0*4Oseq←	Oseq X2 * X9 * X9 * X9 ← Oseq02*0*0*4←	Set a specific skew adjustment for the TP output. X9 values are listed in RGB order. Set output 2's skew settings as follows: Red = 0 ns Green = 0 ns Blue = 8 ns (delayed 8 ns).
Increment one output skew adjustment value	Esc X2 * X10 +Oseq←	Oseq X2 * X9 * X9 * X9 ←	Increase output X2 's X10 plane's skew adjustment by 1 step (2 ns).
Decrement one output skew adjustment value <i>Example:</i>	Esc X2 * X10 -Oseq← Esc 2*2*-Oseq←	Oseq X2 * X9 * X9 * X9 ← Oseq02*0*0*3←	Decrease output X2 's X10 plane's skew adjustment by 1 step (2 ns). Decrease output 2's blue skew by 2 ns to 6 ns.
Read output skew adjustment values	Esc X2 Oseq←	X9 * X9 * X9 ←	

NOTE **X13** = Local video output number
X14 = Local output sync polarity
X2 = Output number
X9 = Skew adjustment range
X10 = Video plane
 1 or 2 (**X13**) applies to matrix sizes 1632 and larger only
 0 = H- / V- (default)
 1 = H+ / V-
 2 = H- / V+
 3 = H+ / V+
 4 = No sync stripping (composite, S-video, YUV)
 01 – 32
 00 – 31 (each step = 2ns)
 0 = red
 1 = green
 2 = blue

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)			Response (switcher to host)			Additional description		
Audio output volume									
NOTE The table below defines the value of each audio volume step.									
X16	value	dB of attenuation	Output volume	X16	value	dB of attenuation	Output volume	X16	
00		76	0%						
01		63	5.5%	23	41	38.5%	45	19	71.5%
02		62	7%	24	40	40%	46	18	73%
03		61	8.5%	25	39	41.5%	47	17	74.5%
04		60	10%	26	38	43%	48	16	76%
05		59	11.5%	27	37	44.5%	49	15	77.5%
06		58	13%	28	36	46%	50	14	79%
07		57	14.5%	29	35	47.5%	51	13	80.5%
08		56	16%	30	34	49%	52	12	82%
09		55	17.5%	31	33	50.5%	53	11	83.5%
10		54	19%	32	32	52%	54	10	85%
11		53	20.5%	33	31	53.5%	55	9	86.5%
12		52	22%	34	30	55%	56	8	88%
13		51	23.5%	35	29	56.5%	57	7	89.5%
14		50	25%	36	28	58%	58	6	91%
15		49	26.5%	37	27	59.5%	59	5	92.5%
16		48	28%	38	26	61%	60	4	94%
17		47	29.5%	39	25	62.5%	61	3	95.5%
18		46	31%	40	24	64%	62	2	97%
19		45	32.5%	41	23	65.5%	63	1	98.5%
20		44	34%	42	22	67%	64	0	100%
21		43	35.5%	43	21	68.5%			
22		42	37%	44	20	70%			
Set the audio volume to a specific value		X15•X16V		OutX15•VolX16←					
Example:		1*50v		Out01•Vol50←					Set output 1 volume to 79%.
Increment volume		X15+V		OutX15•VolX16←					Increment volume by 1 step.
Example:		1+V		Out01•Vol51←					
Decrement volume		X15-V		OutX15•VolX16←					Decrease volume by 1 step.
Read output volume		X15V		X16←					

NOTE X15 = Local audio output number 1 – 4 (matrix sizes 1616 and smaller)
1 – 8 (matrix sizes 1632 and larger)
X16 = Volume adjustment range 0 – 64 (1 dB/step except for 0-to-1, which is 22 dB)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio input gain and attenuation			
NOTE The set gain (G) and set attenuation (g) commands <u>are</u> case sensitive.			
Set input audio gain to +dB value <i>Example:</i>	X3 * X17 G 1*2G	In X3 •Aud X18 ← In01•Aud+02←	Set input 1 audio gain to +2 dB.
Set input audio attenuation to -dB value	X3 * X19 g	In X3 •Aud X18 ←	
Increment gain <i>Example:</i>	X3 +G 5+G	In X3 •Aud X18 ← In05•Aud+03←	Increase gain by 1 dB. Increase audio input 5 level from +2 dB to +3 dB.
Decrement gain <i>Example:</i>	X3 -G 7-G	In X3 •Aud X18 ← In07•Aud-09←	Decrease gain by 1 dB. Decrease audio input 7 level from -8 dB to -9 dB.
Read input gain	X3 G	X18 ←	
Audio or RS-232 mute commands			
Audio or RS-232 mute	X2 *1Z	Amt X2 *1←	Mute output X2 audio or RS-232 (audio off).
Audio or RS-232 unmute	X2 *0Z	Amt X2 *0←	Unmute output X2 audio or RS-232 (audio on).
Read audio or RS-232 mute	X2 Z	X12 ←	1 = mute on, 0 = mute off.
Global audio or RS-232 mute	1*Z	Amt1←	Mute all audio or RS-232 outputs.
Global audio or RS-232 unmute	0*Z	Amt0←	Unmute all audio or RS-232 outputs.
Names			
Write global preset name <i>Example:</i>	Esc X20 , X21 NG← Esc 1,Security 1NG←	Nmg X20 , X21 ← Nmg01,Security 1←	Name global preset 1 "Security 1".
Read global preset name <i>Example:</i>	Esc X20 NG← Esc 2NG←	X21 ← Security 2←	
Write room name <i>Example:</i>	Esc X22 , X21 NR← Esc 1,Classrm 1NR←	Nmr X22 , X21 ← Nmr01,Classrm 1←	Name room 1 "Classrm 1".
Read room name	Esc X22 NR←	X21 ←	
Write room preset name <i>Example:</i>	Esc X22 * X20 , X21 NP← Esc 1*3,Podium_DVDNP←	Nmp X22 * X20 , X21 ← Nmp01*3,Podium_DVD←	Name room 1, preset 3 "Podium_DVD".
Read room preset name	Esc X22 , X20 NP←	X21 ←	
NOTE			
<ul style="list-style-type: none"> If a preset is unassigned, the X21 displays [unassigned]. If a global preset is saved, but not yet named, the default name is Preset X20. If a room preset is saved, but not yet named, the default name is RmX22 PrstX20. 			

- NOTE**
- X3** = Input number
01 – (maximum number of inputs for your model)
 - X17** = Audio gain
0 – 24 (1 dB/step)
 - X18** = Numeric dB value
-18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
 - X19** = Audio attenuation
1 – 18 (1 dB/step)
 - X2** = Output number
01 – 32
 - X12** = Mute
0 = off
1 = on
 - X20** = Global or room preset #
0 – 32, 10 maximum for a room preset (0 = current configuration)
 - X21** = Name
12 characters maximum for input, output, and global preset names
11 characters for room preset names
 - X22** = Room # (for room presets)
10 max. (each can have up to 10 presets (**X20**s) assigned)

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Names (continued)			
Write input name <i>Example:</i>	<code>Esc</code> <code>X3</code> <code>X21</code> <code>NI</code> ← <code>Esc</code> 1,Podium cam <code>NI</code> ←	Nmi <code>X3</code> <code>X21</code> ← Nmi01,Podium cam ←	Name input 1 "Podium cam".
Read input name	<code>Esc</code> <code>X3</code> <code>NI</code> ←	<code>X21</code> ←	
Write output name <i>Example:</i>	<code>Esc</code> <code>X3</code> <code>X21</code> <code>NO</code> ← <code>Esc</code> 1,Main PJ1 <code>NO</code> ←	Nmo <code>X3</code> <code>X21</code> ← Nmo01,Main PJ1 ←	Name output 1 "Main PJ1".
Read output name	<code>Esc</code> <code>X3</code> <code>NO</code> ←	<code>X21</code> ←	
I/O Grouping			
NOTE The group that is assigned in each of the following I/O grouping commands (<code>X23</code>) must be 1, 2, 3, 4, or 0 (not grouped).			
Write input grouping	<code>Esc</code> <code>X23</code> <code>X23</code> <code>X23</code> ... <code>X23</code> <code>I</code> ←	Gri <code>X23</code> <code>X23</code> <code>X23</code> ... <code>X23</code> ←	<i>n</i> = the maximum number of inputs. Each <code>X23</code> entry is the group number assigned to an input position, starting from input 1.
<i>Example: MTPX Plus 168</i> <code>Esc</code> 4013300004440443 <code>I</code> ← See below.			
Input 1 in group 4 Input 2 not grouped Input 12 in group 4			
Response #s = group: 4 0 1 3 3 0 0 0 0 4 4 0 4 4 3 ←			
Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16			
NOTE You must enter and <code>X23</code> value for each input in your matrix size, such as 32 inputs for an MTPX Plus 3216.			
Write output grouping	<code>Esc</code> <code>X23</code> <code>X23</code> ... <code>X23</code> <code>O</code> ←	Gro <code>X23</code> <code>X23</code> <code>X23</code> ... <code>X23</code> ←	<i>n</i> = the maximum number of outputs. Each <code>X23</code> entry is the group number assigned to an output position, starting from output 2.
Read input grouping	<code>Esc</code> <code>I</code> ←	<code>X23</code> <code>X23</code> <code>X23</code> ... <code>X23</code> ←	<i>n</i> = the maximum number of inputs. Each <code>X23</code> entry is the group number assigned to an output position, starting from input 1.
<i>Example: MTPX Plus 1616</i> <code>Esc</code> <code>I</code> ← See below.			
Input 1 in group 1 Input 8 not grouped Input 12 in group 4			
Response = group: 1 1 1 3 3 0 0 0 0 4 4 0 4 4 4 ←			
Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16			
Read output grouping	<code>Esc</code> <code>O</code> ←	<code>X23</code> <code>X23</code> <code>X23</code> ... <code>X23</code> ←	<i>n</i> = the maximum number of outputs.
Save, recall, and directly write presets			
NOTE • If you try to recall a preset that is not saved, the matrix switcher responds with the error code E11. • The following characters are invalid in preset names: +, -, ` @ = [] { } ' " ; : \ and ?.			
Save current configuration as a global preset <i>Example:</i>	<code>X20</code> , 9,	Spr <code>X20</code> ← Spr9 ←	Command character is a comma. Save current ties as preset 9.
Recall a global preset <i>Example:</i>	<code>X20</code> . 5.	Rpr <code>X20</code> ← Rpr05 ←	Command character is a period. Recall preset 5, which becomes the current configuration.

NOTE `X3` = Input number
`X21` = Name
`X23` = Group #
`X20` = Global or room preset #

01 – (maximum number of inputs for your model)
12 characters maximum for input and output names
1 through 4 groups (0 = no group)
0 - 32, 10 maximum for a room preset (0 = current configuration)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, recall, and directly write presets (continued)			
<u>Direct write process —</u>			
<p>NOTE The direct write of a global preset should always be preceded by a clear global preset ties command of that same preset number, as shown below. In a directly-written preset, each output position's tied input (or no tied input) remains unchanged unless overwritten or cleared.</p> <p>If you do not clear the ties in a global preset number before you directly write a global preset to that number, ties that are part of the previous version of the specified preset with the same number can unexpectedly become part of the newly-created preset.</p>			
Clear a global preset's ties	<code>[Esc]+[X20]P0*!←</code>	<code>Spr[X20]←</code>	Clear all ties in preset [X20].
Directly write a global preset	<code>[Esc]+[X20]P[X1]*[X2][X1]*[X2]%[X1]*[X2]\$... [X1]*[X2]&←</code>	<code>Spr[X20]←</code>	The tie all (!), tie RGB (&), tie video (%), and tie audio (\$) commands are all valid.
Example:	<code>[Esc]+27P0*!←</code> <code>[Esc]+27P12*5[10*09%3*2\$3*8&←</code>	<code>Spr27←</code> <code>Spr27←</code>	Clear all ties in preset 27. <u>Brackets are shown to separate ties for clarity only.</u> Create global preset 27, which ties video and audio input 12 to output 5, video input 10 to output 9, audio input 3 to output 2, and video input 3 to output 8.
Write room outputs	<code>Mpr[X22],[X2]¹, [X2]², ... [X2]ⁿ←</code>	<code>Mpr[X22],[X2]¹, [X2]², ... [X2]ⁿ←</code>	See notes.
<p>NOTE</p> <ul style="list-style-type: none"> • A room can contain a maximum of 16 outputs ([X2]s). • An output can belong to only one room. • The maximum number of rooms ([X22]s) is 10. • If no room name is assigned, the default name is "Room # [X22]•[X3]¹, •[X1]², •[X2]ⁿ" 			
Example:	<code>[Esc]8,3,04,5,6MR←</code>	<code>Mpr8,03,04,05,06←</code>	Outputs 3, 4, 5, and 6 are assigned to room 8.
Read room outputs	<code>[Esc][X22]MR←</code> <code>[Esc]3MR←</code>	<code>[X20],[X2]¹, [X2]², ... [X2]ⁿ←</code> <code>Class 1,01,02,08,09←</code>	Outputs 1, 2, 8, and 9 are assigned to room 3, which named "Class 1".
Recall room preset	<code>[X22]*[X20].</code>	<code>Rmm[X22]•Rpr[X20]←</code>	Command character is a period.
Directly write a room preset	<code>[Esc]+[X22]*[X20]P[X1]*[X2][X1]*[X2]%[X1]*[X2]\$... [X1]*[X2]&←</code>	<code>Rmm[X22]•Spr[X20]←</code>	Enter as many ties as are valid for this model. Tie all (!), tie RGB (&), tie video (%), and tie audio (\$) commands are all valid.
Example:	<code>[Esc]+7*3P12*7&11*5\$4*5%6*6!←</code>	<code>Rmm07•Spr03←</code>	<u>Brackets are shown to separate ties for clarity only.</u> Create preset 3 for room 7, which ties audio input 12 to output 7, video input 11 to output 5, RGB input 4 to output 5, and video and audio input 6 to output 6.

- NOTE**
- [X20] = Global or room preset # 0 - 32, 10 maximum for a room preset (0 = current configuration)
 - [X1] = Input number 00 – (maximum number of inputs for your model)
 - [X2] = Output number 00 – (maximum number of inputs for your model)
 - [X22] = Room # (for room presets) 10 max. (each can have up to 10 presets ([X20]s) assigned)

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Lock (executive) modes			
NOTE See "Setting the front panel locks (Executive modes)" in chapter 3, "Operation", for more information on the Lock modes.			
Lock all front panel functions	1X	Exe1↵	Enable Lock mode 1.
Lock advanced front panel functions	2X	Exe2↵	Enable Lock mode 2.
Unlock all front panel functions	0X	Exe0↵	Enable Lock mode 0.
View lock status	X	X12↵	
Resets			
Reset all input level and peaking adjustments	EscZT↵	Zpt↵	Clear all level and peaking adjustments to their default (0) values.
Reset all input and output skew adjustments	EscZK↵	Zpk↵	Clear all input and output skew values to 0 ns.
Reset global presets and names	EscZG↵	Zpg↵	Clear all global presets and their names.
Reset one global preset	EscX20ZG↵	ZpgX20↵	Clear global preset X20.
Reset audio input levels	EscZA↵	Zpa↵	Reset all audio input levels (gain and attenuation) to 0 dB.
Reset audio output levels	EscZV↵	Zpv↵	Reset all audio output levels (volume) to 100% (no attenuation).
Reset all mutes	EscZZ↵	Zpz↵	Reset all audio or RS-232 mutes.
Reset room map	EscZR↵	Zpr↵	Clear all room definitions.
Reset individual room	EscX22ZR↵	ZprX22↵	Delete room X22.
Reset all room presets and names	EscZP↵	Zpp↵	Clear an individual room preset and name.
Reset individual room preset and name	EscX22X20ZP↵	ZppX22X20↵	Clear an individual room preset and name.
Reset flash	EscZFFF↵	Zpf↵	Reset flash memory (erase all user-supplied files).
Reset whole switcher	EscZXXX↵	Zpx↵	Clear all ties and presets, reset all audio gains to 0 dB, and reset volume to 100%.
Absolute reset	EscZQQQ↵	Zpq↵	Similar to Reset whole switcher , plus clear the IP address to 192.168.254.254 and subnet mask to 255.255.000.000.

NOTE X12 = Lock mode

0 = mode 0
1 = mode 1
2 = mode 2

X20 = Global or room preset #
X22 = Room # (for room presets)

0 - 32, 10 maximum for a room preset (0 = current configuration)
10 max. (each can have up to 10 presets (X20s) assigned)

Command/response table for SIS commands (continued)

[illegible]

NOTE	X2 = Output number	01 – 32
	X1 = Input number	00 – (maximum number of inputs for your model)
	X15 = Local audio output number	1 – 4 (matrix sizes 1616 and smaller)
		1 – 8 (matrix sizes 1632 and larger)
	X3 = Input number	01 – (maximum number of inputs for your model)
	X16 = Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 22 dB)
	X18 = Numeric dB value	–18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
	X24 = Audio or RS-232 mute:	0 = no mutes
		2 = audio or RS-232 mute
	X20 = Global or room preset #	0 – 32, 10 maximum for a room preset (0 = current configuration)

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, and DIP switch status (continued)			
View audio global preset configuration	Esc X20 * X2 *2VC ←	X1 ⁿ • X1 ⁿ⁺¹ •...• X1 ⁿ⁺¹⁵ •Aud ←	Show preset X20 's audio configuration. Show the input tied to 16 sequential outputs, starting from output X2 .
<p><i>Command description:</i> preset #*starting output # (StO#)*2(=audio)VC</p> <p><i>Response description:</i> input # (I#) tied to StO•I# tied to StO#+1•I# tied to StO#+2• ... •I# tied to StO#+15•Aud ←</p> <p>NOTE The starting output number (X2) should always be "1" for matrix sizes of 16 outputs or smaller.</p> <p>NOTE EscX20*1*2VC ← where X20 = 0 returns the switcher's current audio configuration.</p> <p><i>Example:</i> Esc15*17*2VC ←</p> <p>(MTPX Plus 1632)</p> <p>input 1 tied to output 3 no tied input</p> <p>Response = tied input: 01•01•01•01•02•12•12•00•00•00•00•00•01•08•15•16•Aud ←</p> <p>Output: 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32</p> <p>Each position shown in the response is an output: left = starting output (17), right = starting output +15 (32). The number in each position is the input tied to that output.</p> <p>In this example, preset 15, audio input 1 is tied to outputs 17, 18, 19, 20, and 29; input 2 is tied to output 21; input 12 is tied to outputs 22 and 23; input 8 is tied to output 30; input 15 is tied to output 31; and input 16 is tied to output 32. No input is tied to output 24, 25, 26, 27, and 28.</p>			
View video room preset configuration	Esc X22 * X20 *1*1VC ←	X1 ⁿ • X1 ⁿ⁺¹ •...• X1 ⁿ⁺¹⁵ •Vid ←	Show room X22 , preset X20 's video configuration. Show the input tied to up to 16 outputs assigned to room X22 .
<p><i>Command description:</i> room #*room preset #*starting output # (StO#)*1(=video)VC</p> <p><i>Response description:</i> input # (I#) tied to StO•I# tied to StO#+1•I# tied to StO#+2• ... •I# tied to StO#+15•Vid ←</p> <p>NOTE The starting output number (X2) should always be "1" for matrix sizes of 16 outputs or smaller.</p>			
View audio room preset configuration	Esc X22 * X20 *1*2VC ←	X1 ⁿ • X1 ⁿ⁺¹ •...• X1 ⁿ⁺¹⁵ •Aud ←	Show room X22 , preset X20 's audio configuration. Show the input tied to up to 16 outputs assigned to room X22 .
<p><i>Command description:</i> room #*room preset #*starting output # (StO#)*2(=audio)VC</p> <p><i>Response description:</i> input # (I#) tied to StO•I# tied to StO#+1•I# tied to StO#+2• ... •I# tied to StO#+15•Aud ←</p> <p>NOTE The starting output number (X2) should always be "1" for matrix sizes of 16 outputs or smaller.</p>			

NOTE **X20** = Global or room preset #
X2 = Output number
X1 = Input number
X22 = Room # (for room presets)

0 - 32, 10 maximum for a room preset (0 = current configuration)
01 - 32
00 - (maximum number of inputs for your model)
10 max. (each can have up to 10 presets (**X20**s) assigned)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, and DIP switch status (continued)			
View Input Select DIP switch positions and level/ peaking status	[Esc] Stat←	[X25] [X25] ² ... [X25] ⁿ [X8] ↵	Each [X25] is the switch position for that rear panel Input Select DIP switch from 1 to <i>n</i> . <i>n</i> = 3 for matrix sizes up to 1616, <i>n</i> = 6 for matrix sizes of 1632 and larger. [X8] indicates whether the input level/peaking is within the pre-determined threshold for the input tied to output 1 only.
NOTE The response to the View File Directory command differs, depending on whether the command is sent via an RS-232/RS-422 or Telnet connection or sent via a Web browser connection.			
View file directory RS-232/RS-422 port and Telnet	[Esc] DF←	filename1,date/time,length↵ filename2,date/time,length↵ filename3,date/time,length↵ • • • • filename _n ,date/time,length↵ # of Bytes•Left↵↵	List user-supplied files.
View file directory Web browser	[Esc] DF←	Var file = new array (); File [1] = 'filename1,date1,filesize1'; File [2] = 'filename2,date2,filesize2'; File [3] = 'filename3,date3,filesize3'; • • • • File [<i>n</i>] = 'filename _n ,date _n ,filesize _n '; File [<i>n</i> +1] = # of Bytes•Left	List user-supplied files.
Erase user-supplied Web pages/files	[Esc] filenameEF←	Delfilename↵	

NOTE **[X25]** = Local input select DIP switch status

[X8] = Threshold

0 = RJ-45 position

1 = local input position

0 = outside of threshold

1 = within threshold

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description									
Information requests												
Information request	I	V[X26]X[X27]•A[X26]X[X27]↵	V (video) matrix size• A (audio) matrix size									
Request part number	N	[X28]↵	See appendix B for part numbers.									
<div>NOTE</div> <div>There are up to three separate sets of Extron firmware on which the switcher can report: the controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at www.extron.com.</div>												
Query controller firmware version	Q	[X29]↵										
Example:	Q	1.23↵	The factory-installed controller firmware version is 1.23 (sample value only).									
Query controller firmware version (verbose)	0Q	[X29]•[X30]•[X30]↵	Provide a detailed status of the MTPX Plus controller firmware and any firmware upgrade. The firmware that is running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ??? indicates that firmware is not loaded.									
Response description: Ethernet protocol firmware version-controller firmware version-updated firmware version↵												
Example: 0q												
<table><tr><td>Description</td><td>* indicates the version running</td><td>Upload date and time</td></tr><tr><td>1.23-1.00(1.06-16x16 Series</td><td>-Tue, 04 Dec 2007 00:00:00 GMT)-1.00*(1.06-16x16 Series</td><td>-Thu, 27 Dec 2006 16:39:21 GMT)↵</td></tr><tr><td>Ethernet protocol firmware</td><td>MTPX firmware version</td><td>Updated firmware version</td></tr></table>				Description	* indicates the version running	Upload date and time	1.23-1.00(1.06-16x16 Series	-Tue, 04 Dec 2007 00:00:00 GMT)-1.00*(1.06-16x16 Series	-Thu, 27 Dec 2006 16:39:21 GMT)↵	Ethernet protocol firmware	MTPX firmware version	Updated firmware version
Description	* indicates the version running	Upload date and time										
1.23-1.00(1.06-16x16 Series	-Tue, 04 Dec 2007 00:00:00 GMT)-1.00*(1.06-16x16 Series	-Thu, 27 Dec 2006 16:39:21 GMT)↵										
Ethernet protocol firmware	MTPX firmware version	Updated firmware version										
Request system status	S	[X31]•[X31]•[X31]•[X31]•[X31]•[X32]•[X33]•[X33]↵										
Response description: +3.3V•+5V•-5V•+12V•-12V•temperature (degrees fahrenheit)•Fan 1 speed•Fan 2 speed•Fan 3 speed↵												
<div>NOTE</div> <div>Fans are numbered 1, 2, and 3, from rear to front.</div>												
Example:		+12V power system at 11.62V 3.28•+4.98•-5.01•+11.52•-12.35•+086.80•03590•03668•03627↵ 3.3V power system at 3.28V Fan 1 (rear) rotating at 3590 RPM										

NOTE	[X26] = Number of inputs	8, 16, or 32
	[X27] = Number of outputs	8, 16, or 32
	[X28] = Part number	60-nnn-nn
	[X29] = Firmware version number to second decimal place (x.xx)	
	[X30] = Verbose firmware version-description-upload date/time	
	[X31] = Voltage	Positive or negative voltage and magnitude
	[X32] = Temperature	Degrees Fahrenheit
	[X33] = Fan speed	RPM

Command/Response Table for IP-specific SIS Commands

Symbol definitions

X40 = Matrix name	(Up to 240 alphanumeric characters)
NOTE The following characters are invalid in the name: {space} ~ , @ = ` [] { } < > ' " ; : \ and ?.	
X41 = Default name	MTPX- + last 3 pairs of MAC address
X42 = Time and date (for set)	In the format: MM/DD/YY•HH:MM:SS where: MM = month: 01 (January) through 12 (December) DD = 01 through 31 YY = 00 through 99 HH = 00 through 23 MM = 00 through 59 SS = 00 through 59
X43 = Time and date (for read)	In the format: Day,•DD•Mmm•YYYY•HH:MM:SS where: Day of the week: Mon through Sun DD = 01 through 31 Mmm = month: Jan through Dec YYYY = 2000 through 2099 HH = 00 through 23 MM = 00 through 59 SS = 00 through 59
X44 = GMT offset	-12.0 through +14.0. Hours and minutes removed from GMT
X45 = Daylight Savings Time	0 = Daylight Savings Time off/ignore 1 = Daylight Savings Time on (northern hemisphere) 2 = Daylight Savings Time on (Europe) 3 = Daylight Savings Time on (Brazil)
X46 = IP address	###.###.###.###
X47 = Hardware (MAC) address	##-##-##-##-##-##
X48 = Number of open connections	0 - 255
X49 = Password	Up to 12 alphanumeric characters
NOTE The following characters are invalid in passwords: {space} + ~ , @ = ` [] { } < > ' " ; : \ and ?.	
X50 = Domain name	Standard domain name rules apply (for example: xxx.com)
NOTE The following characters are invalid in a domain name: {space} + ~ , = ` [] { } < > ' " ; : \ and ?. The @ character is acceptable only as the lead-in to the domain name (such as @extron.com).	
X51 = E-mail account	65 - 72. 65 = e-mail recipient 1, 66 = 2, 67 = 3, ... 72 = recipient #8
X52 = E-mail address	Typical e-mail address format (for example: nnnm@xxx.com)
X53 = Notify when?	0 = no response 3 = both 1 & 2 1 = fail/missing 4 = suspend 2 = fixed/restored
X54 = Notification selections	00 = both fans, 01 (fan 1), or 02 (fan 2)
X55 = Notify status (for read)	17-digit number. For each digit: 0 = do not notify, 1 = notify
X56 = DHCP	0 = 1 off, 1 = on
X57 = Port #	00 through 99 (00 = all ports)
X58 = Baud rate	9600, 19200, 38400, 115200
X59 = Parity	odd, even, none, mark, space (only the first letter required)
X60 = Data bits	7, 8
X61 = Stop bits	1, 2
X62 = Port type	0 = RS-232 1 = RS-422 2 = RS-485
X63 = Verbose mode	0 = clear/none (default for Telnet connection) 1 = verbose mode (default for RS-232/RS-422 connection) 2 = tagged responses for queries 3 = verbose mode and tagged for queries
NOTE If tagged responses is enabled (modes 2 and 3), all read commands return the constant string and the value as the set command does (for example, the read matrix name command Esc CN←, returns lpn• X40 ←).	
X64 = Flow control	hardware, software, none (only the first letter required)
X65 = Data pacing (in ms between bytes)	0000 (default) - 1000

Programmer's Guide, cont'd

X66	=	Time (in 10 ms increments) to wait for characters	10 (= 100 ms, default) - 32767
X67	=	Time (in 10 ms increments) to wait between characters	2 (= 20 ms, default) - 32767
X68	=	Port timeout interval (in 10-sec. increments)	1 (= 10 seconds) - 65000 (default is 30 = 300 seconds = 5 minutes)

Command/response table for IP-specific SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
IP setup commands			
Set matrix name	Esc X40 CN ←	Ipn• X40 ←	
Read matrix name (location)	Esc CN ←	X40 ←	
Reset matrix name to factory default	Esc •CN ←	Ipn• X40 ←	
Set time and date	Esc X42 CT ←	Ipt X42 ←	
Read time and date	Esc CT ←	X43 ←	
Set GMT offset	Esc X44 CZ ←	Ipz X44 ←	In the command, the divider between hours and minutes can be either a colon or a period. In the response, the divider is a colon.
<i>Example:</i>	Esc 8.0CZ ←	Ipz+08:00 ←	8.3 = 8:30
Read GMT offset	Esc CZ ←	X44 ←	
Set Daylight Savings Time	Esc X45 CX ←	X45 ←	
Read Daylight Savings Time	Esc CX ←	X45 ←	
Set IP address	Esc X46 CI ←	Ipi X46 ←	
Read IP address	Esc CI ←	X46 ←	
Read hardware address	Esc CH ←	X47 ←	Reads MAC address.
Read # of open connections	Esc CC ←	X48 ←	
Set subnet mask	Esc X46 CS ←	Ips X46 ←	
Read subnet mask	Esc CS ←	X46 ←	
Set gateway IP address	Esc X46 CG ←	Ipg X46 ←	
Read gateway IP address	Esc CG ←	X46 ←	
Set administrator password	Esc X49 CA ←	Ipa• X49 ←	
Read administrator password	Esc CA ←	X49 ←	
Reset (clear) administrator password	Esc •CA ←	Ipa• ←	
Set user password	Esc X49 CU ←	Ipu• X49 ←	
Read user password	Esc CU ←	X49 ←	
Reset (clear) user password	Esc •CU ←	Ipu• ←	
Set mail server, domainname	Esc X46 , X50 , X49 CM ←	Ipm X46 , X50 , X49 ←	
Read mail server, domainname	Esc CM ←	X46 , X50 , X49 ←	
Set e-mail recipient	Esc X51 , X52 CR ←	Ipr X51 , X52 , ←	This command sets the recipient. To receive e-mail notifications, you must then set the events that the switcher reports, using one or more separate <i>Set e-mail events (EM)</i> commands (see next page).
<i>Example:</i>	Esc 72,Jsmith@folklore.netCR ←	Ipr72,Jsmith@folklore.net, ←	
Read e-mail recipient	Esc X51 CR ←	X52 , ←	

Programmer's Guide, cont'd

Command/response table for IP-specific SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
IP setup commands (continued)			
Set e-mail events for recipient	[Esc]F,[X51],[X54],[X53]EM ←	IpeF,[X51],[X54],[X53] ←	You must first have set an e-mail recipient for the e-mail account number ([X51]), using the separate Set e-mail recipient (CR) command. E-mail account #72, JSmith, will receive fail/missing and fixed/restored messages for both fans.
<i>Example:</i>	[Esc]F,72,0,2EM ←	IpeF*72*0*3 ←	
Read e-mail events for recipients	[Esc][X51],[X54],[X53]EM ←	[X54],[X54],[X54], ... , [X54] ←	
Set DHCP on or off	[Esc][X56]DH ←	Idh[X56] ←	
Read DHCP on/off status	[Esc]DH ←	[X56] ←	
Set serial port parameters	[Esc][X57]*[X58],[X59],[X60],[X61]CP ←	Cpn[X57]•Ccp[X58],[X59],[X60],[X61] ←	
Read serial port parameters	[Esc][X57]CP ←	[X58],[X59],[X60],[X61] ←	
Configure flow control	[Esc][X57]*[X64],[X65]CF ←	Cpn[X57]•Cfl[X64],[X65] ←	
Read flow control	[Esc]CF ←	[X64],[X65] ←	
Configure receive timeout	[Esc][X57]*[X66],[X67]CE ←	Cpn[X57]•Cce[X66],[X67] ←	
Read receive timeout	[Esc]CE ←	[X66],[X67] ←	
Set mode	[Esc][X57]*[X62]CY ←	Cpn[X57]•Cty[X62] ←	
Read mode	[Esc][X57]CY ←	[X62] ←	
Set verbose mode	[Esc][X63]CV ←	Vrb[X63] ←	
Read verbose mode	[Esc]CV ←	[X63] ←	
Configure current port timeout	[Esc]0*[X68]TC ←	Pti0*[X68] ←	
Read current port timeout	[Esc]0TC ←	[X68] ←	
Configure global IP port timeout	[Esc]1*[X68]TC ←	Pti1*[X68] ←	
Read global IP port timeout	[Esc]1TC ←	[X68] ←	

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space (spaces are ok for names)} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:) | \ and ?.



MTPX Plus Twisted Pair Matrix Switchers

5 **Chapter Five**

Matrix Software

Matrix Switchers Control Program

Optimizing the Video

Special Characters

Button-Label Generator Program

Matrix Software

Matrix Switchers Control Program

The Windows-based Extron Matrix Switchers Control Program communicates with the switcher via the Ethernet LAN port, the rear panel Remote RS-232/RS-422 port, and the front panel Configuration (RS-232) port to provides an easy way to set up ties and sets of ties. The program is compatible with Windows 2000, Windows XP, and later. Updates to these programs can be downloaded from the Extron Web site (www.extron.com).

Installing the software

The program is contained on the Extron Software Products CD-ROM, disk B. Install the software as follows:

NOTE For full functionality, install both of the following programs:

- The Matrix Switchers Control Program
- The Firmware Loader

1. Insert the CD-ROM into the drive. The installation program should start automatically. If it does not self-start, run Launch.exe from the CD.

The Extron software CD window appears (figure 5-1).

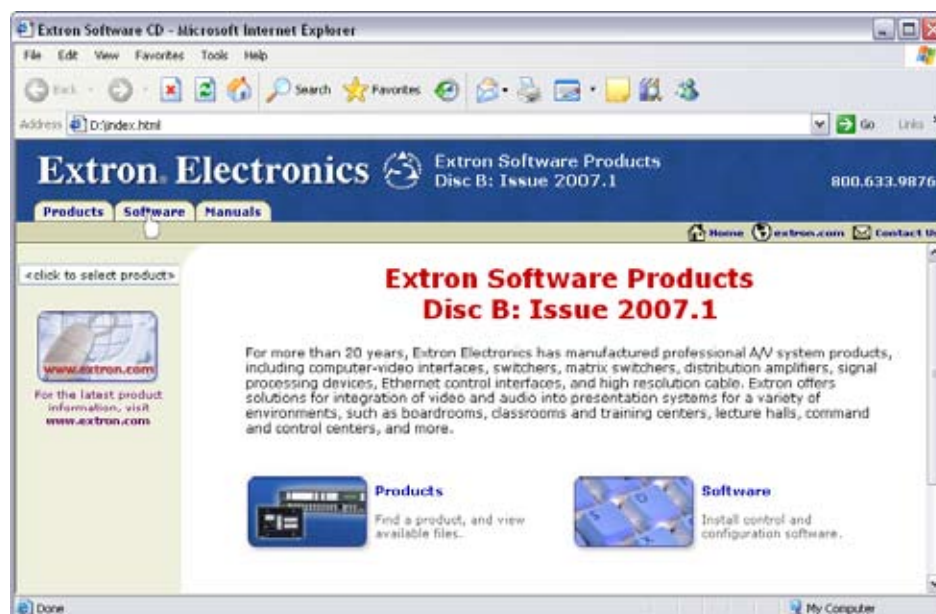


Figure 5-1 — Software CD window

2. Click the Software tab (figure 5-1).
3. Scroll to the desired program and click Install (figure 5-2).

• Matrix Switchers RS-232 Windows Control Program. Release Notes	79-520-01	7.1	Sep 7, 2006	4.6 MB	Install
---	-----------	-----	-------------	--------	-------------------------

Figure 5-2 — Software installation

-
4. Follow the on-screen instructions. By default, the Windows installation of the Matrix Switchers Control Program creates a C:\Program Files\Extron\Matrix_Switchers directory, and it places the following four icons into a group folder named “Extron Electronics\Matrix Switchers”:

- MATRIX Switcher+ Control Program
- MATRIX Switcher+ Help
- Uninstall MATRIX Switcher
- Check for Matrix Updates

NOTE Besides the LAN port, the MTPX Plus switcher can support remote control via either the rear panel Remote RS-232/RS-422 Remote port or the front panel Configuration port.

Remote RS-232/RS-422 port — The port can be configured for either the RS-232 or RS-422 serial communication protocol and operate at the 9600, 19200, 38400, or 115200 baud rate. See “Selecting the rear panel Remote port protocol and baud rate” in chapter 3, “Operation”, to configure the rear panel port from the front panel.

Configuration port — The port supports RS-232 serial communication protocol only. The port can operate at the 9600, 19200, 38400, or 115200 baud rate, but Extron recommends leaving this port at the 9600 baud rate. See the Serial port parameters SIS commands on page 4-26 to configure either port using an SIS command.

Software operation via Ethernet

When an MTPX Plus switcher is connected to an Ethernet WAN or LAN, up to 200 users can operate it, locally or remotely, using the Matrix Switchers Control Program. See “Ethernet connection” in chapter 2, “Installation”, for installation details.

Connection to the switcher via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all MTPX Plus switching capabilities and editing functions. Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are grayed out in the Matrix Switchers Control Program when the operator is logged on as a user.

Ethernet protocol settings

The IP Settings/Options screen (figure 5-7 on page 5-7) provides a location for viewing and, if connected via the RS-232 link or if logged on via the LAN port as an administrator, editing settings unique to the Ethernet interface. See “IP Settings/Options window”, later in this chapter, for more details.

Matrix Software, cont'd

Using the Matrix Switcher Control software

Many items found in the Matrix Switchers Control Program are also accessible via front panel controls (see chapter 3, "Operation") and under SIS control (see chapter 4, "Programmer's Guide"). The Matrix Switcher+ Help Program provides information on settings and on how to use the control program itself.

1. To run the Matrix Switchers Control Program, click **Start** > **Programs** > **Extron Electronics** > **Matrix Switchers** > **MATRIX Switcher + Control Pgm** or click the desktop icon shown at right.



The Comm Port Selection window (figure 5-3) appears.

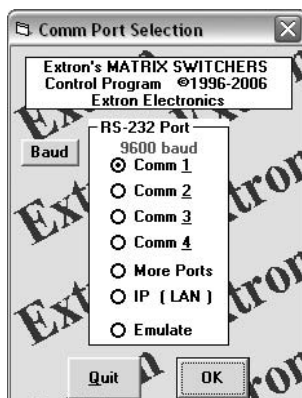
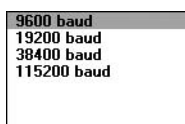


Figure 5-3 — Comm port selection window

2. Choose either the comm port that is connected to the MTPX Plus switcher's rear panel Remote port or front panel Config port, IP [LAN], or Emulate.

- If you selected a comm port, check the baud rate displayed in the comm port selection window. If you need to change the baud rate, click on the Baud button and double-click on the desired baud rate.



Available rates are 9600, 19200, 38400, and 115200. The default is 9600.

Click **OK** and proceed to step 4.

- If you selected IP [LAN], click **OK** and proceed to step 3.
 - If you selected Emulate, click **OK** and see "Using Emulation mode" on page 5-23.
3. If you selected IP [LAN] in step 2, the IP Connection window appears (figure 5-4).

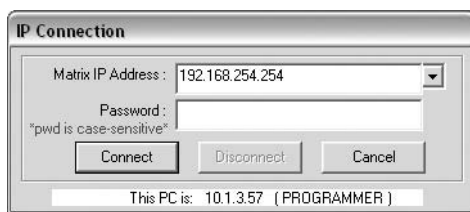


Figure 5-4 — Address and password entry

- a. Examine the Matrix IP Address field in the IP Connection window. The field displays the last Matrix IP address entered.

If the IP address is correct: Proceed to step 3b.

If the address is not correct: Either click in the Matrix IP Address field and enter the IP address or click on the scroll down button (▼) and select from among the recently used addresses. Proceed to step 3b.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

- b. If the switcher is password protected, click in the Password field and enter the appropriate administrator or user password.
- c. Click **Connect**.

If you logged on using the administrator password, the Windows program connects you to the MTPX Plus switcher with all of the administrator rights and privileges.

If you logged on using the user password, the Windows program connects you to the MTPX Plus switcher with only user capabilities.

If an incorrect password was entered, the program beeps and returns to the password entry display.

4. The Extron Matrix Switchers Control Program window (figure 5-5 and figure 5-6) appears. The window displays the current configuration of the attached matrix.

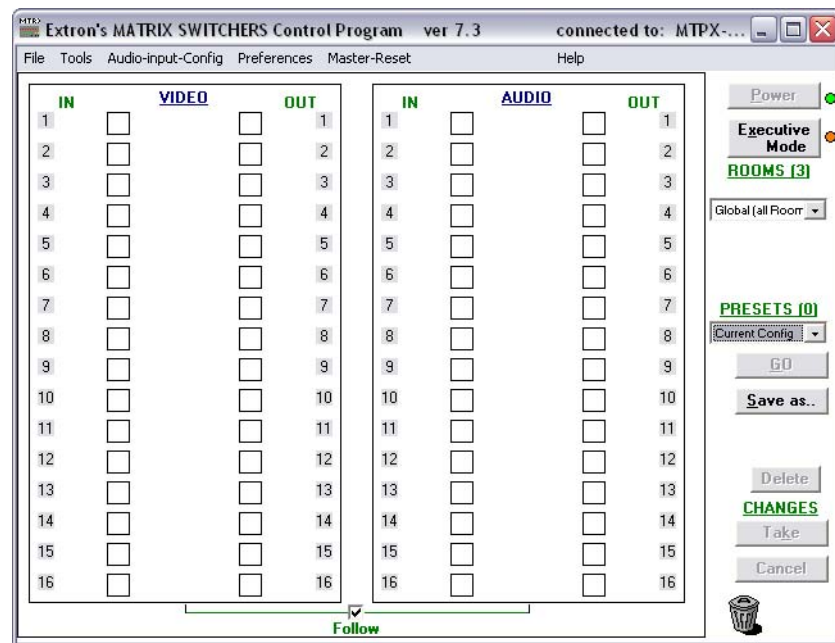


Figure 5-5 — Extron Matrix Switchers Control Program window (blank)

Matrix Software, cont'd

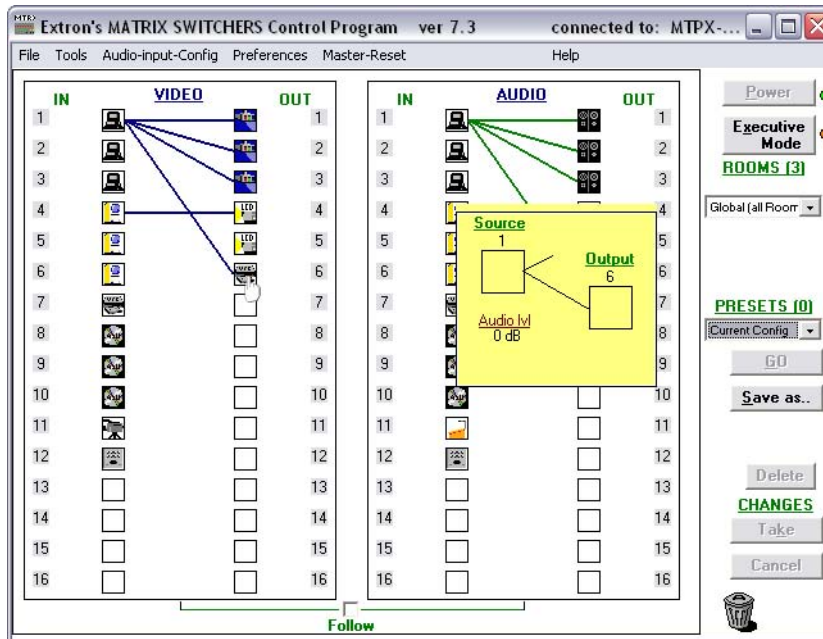


Figure 5-6 — Sample program window (complete)

- To set up audio in *Follow* mode (audio and video have the same tie configuration), select the **Follow** box at the bottom of the window (figure 5-5). To set up audio in breakaway mode (audio and video have different tie configurations), deselect the **Follow** box (figure 5-6).
- To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.
- To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.
- For quick display of information on a specific input or output device, position the cursor over that device in the control program window. The program opens a window that details the connections to that device, the audio level, and the frequency of the video signal input from or output to that device. See the inset box in figure 5-6.

HINT You can print a map of the current configuration by clicking **File > Print Tie Map**.

IP Settings/Options window

The IP Settings/Options window (figure 5-7) provides a location for viewing and, if connected via the either serial port or if you are logged on via the LAN port as an administrator, editing settings unique to the Ethernet interface. See appendix A, “Ethernet Connection”, for basic information about IP addresses. You cannot edit any of the fields on this screen while you are logged on as a user.

NOTE Editing variables on the IP Settings/Options screen while connected via the LAN port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using a serial port and protecting the Ethernet access to this screen by assigning an administrator’s password to qualified and knowledgeable personnel only.

Figure 5-7 — Control program IP settings/options window

NOTE When the control program is connected to the switcher via a serial port, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.

Matrix IP Address field

The Matrix IP Address field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

The default address is 192.168.254.254, but if this conflicts with other equipment at your installation, consult with the network administrator to get a new, valid address.

NOTE Editing the Matrix IP address while connected via the LAN port can immediately disconnect the user from the matrix switcher. Extron recommends editing this field using a serial port and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.

Edit this field as follows:

1. Click in the Matrix IP address field. The graphic cursor becomes a text cursor.
2. Edit the address as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Matrix IP Address field.
4. Click the **Take** button to make the address change take affect.

Extron Name/Descriptor field

The Extron Name/Descriptor field contains the name used as the “from” information when the MTPX Plus switcher e-mails notification of its failed or repaired status. This descriptor can be changed to any valid name, up to 12 alphanumeric characters.

NOTE *The following characters are invalid in the Extron Name/Descriptor field: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

Edit this field as follows:

1. Click in the Extron name/descriptor field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Extron Name/Descriptor field.
4. Click the **Take** button to make the name change take effect.

Gateway IP address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the MTPX Plus switcher and the mail server are not on the same subnet.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

1. Click in the Gateway IP Address field. The graphic cursor becomes a text cursor.
2. Edit the address as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Gateway IP Address field.
4. Click the **Take** button to make the address change take affect.

Subnet Mask field

The Subnet Mask field is used to determine whether the MTPX Plus switcher is on the same subnet as the controlling PC or the mail server when you are subnetting. For more information, see “Subnetting — A Primer”, in appendix A, “Ethernet Connection”.

Edit this field as follows:

1. Click in the Subnet Mask field. The graphic cursor becomes a text cursor.
2. Edit the mask as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Subnet Mask field.
4. Click the **Take** button to make the mask take affect.

Hardware Address field

The hardware address is hardcoded in the MTPX Plus switcher and cannot be changed.

Use DHCP check box

The **Use DHCP** check box directs the MTPX Plus switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator.

Date, Time (local), and GMT (offset) fields

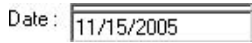
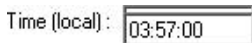
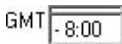
The **Date** field displays the current date in the Greenwich Mean Time zone.

The **Time (local)** field displays the current time in the local time zone.

The **GMT** field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

NOTE *Rather than the following procedure, you can click the **Sync Time to PC** button to set the switcher to your computer's internal time.*

If desired, adjust any of these values as follows:

1. Click in the desired field. The field changes to an editable field appropriate to the value being change and the graphic cursor becomes a text cursor.
 - The **Date** field becomes a set date field, with the date in the format (M)M/(D)D/YYYY. Leading zeroes are not shown. 
 - The **Time (local)** field becomes a set time field, with the time in the format HH:MM:SS (00:00:00 to 23:59:59). 
 - The **GMT** field becomes a set offset field, with the offset in the format ±HH:MM (–12:00 to +14:00). 
2. Edit the field as desired to set the proper proper value. For time, remember to use 24-hour time. Leading zeroes are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set date field.
4. Click the *Take* button to make the date change take affect.

Sync Time to PC button

Clicking the **Sync Time to PC** button causes the computer you are operating to send its internal time to the switcher in a set time command.

Use Daylight Savings check box

Click in the **Use Daylight Savings** check box. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

Mail Server IP Address field

The Mail Server IP Address field displays the IP address of the mail server that handles the e-mail for the facility in which the MTPX Plus switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

1. Click in the mail server IP address field. The graphic cursor becomes a text cursor.
2. Edit the IP address as desired.
3. Press the Tab key on the keyboard or click in another field to exit the mail server IP address field.
4. Click the **Take** button to make the address change take affect.

Mail Server Domain Name field

The Mail Server Domain Name field displays the domain name that the MTPX Plus switcher uses to log on to the e-mail server. Standard domain conventions (such as xxx.com) apply.

NOTE *The following characters are invalid in a domain name: {space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is only acceptable as the lead-in to the domain name (such as @folklore.net).*

Edit this field as follows:

1. Click in the Mail Server Domain Name field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Mail Server Domain Name field.
4. Click the **Take** button to make the name change take affect.

E-mail Addressee fields

The eight E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the MTPX Plus switcher e-mails notification of its failure and repair status. Figure 5-8 shows a typical e-mail from the switcher.

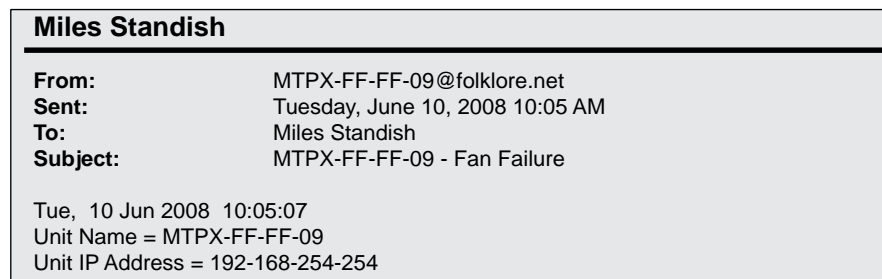


Figure 5-8 — Typical MTPX Plus e-mail

The radio buttons and check boxes associated with each address field permit the administrator to specify specific e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The graphic cursor becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions (for example: *nnnnn@xxx.com*) apply.
3. Press the Tab key on the keyboard or click in another field to exit the e-mail addressee field.
4. In the square Fans check boxes associated with each addressee, select or deselect the fans for status to be e-mailed to the addressee.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of failures, fixes, both, or not be notified. The None radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation.
6. If desired, click the **Send test E-mail** button to test the e-mail function.
7. Click the **Take** button to make the e-mail address changes take affect.

Matrix Software, cont'd

Updating firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service.

Update the switcher firmware as follows:

1. Visit the Extron Web site, www.extron.com, click the **Download Center** tab, and then click the **Firmware** link (figure 5-9).

NOTE This sequence is shown for example only. For the MTPX Plus, the firmware file selected and shown is "MTPX Plus".

Figure 5-9 — Location of firmware upgrade files

2. Select the appropriate firmware file (MTPX 1616 Series) to download and click **Download**.
3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.
4. Click **Run** twice (figure 5-10 on the next page). The PC downloads the firmware update from the Extron Web site and starts the Extron Installation Program to extract the firmware file.
5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

NOTE Note the folder to which the firmware file is saved.

6. Click **Finish** to exit the program.

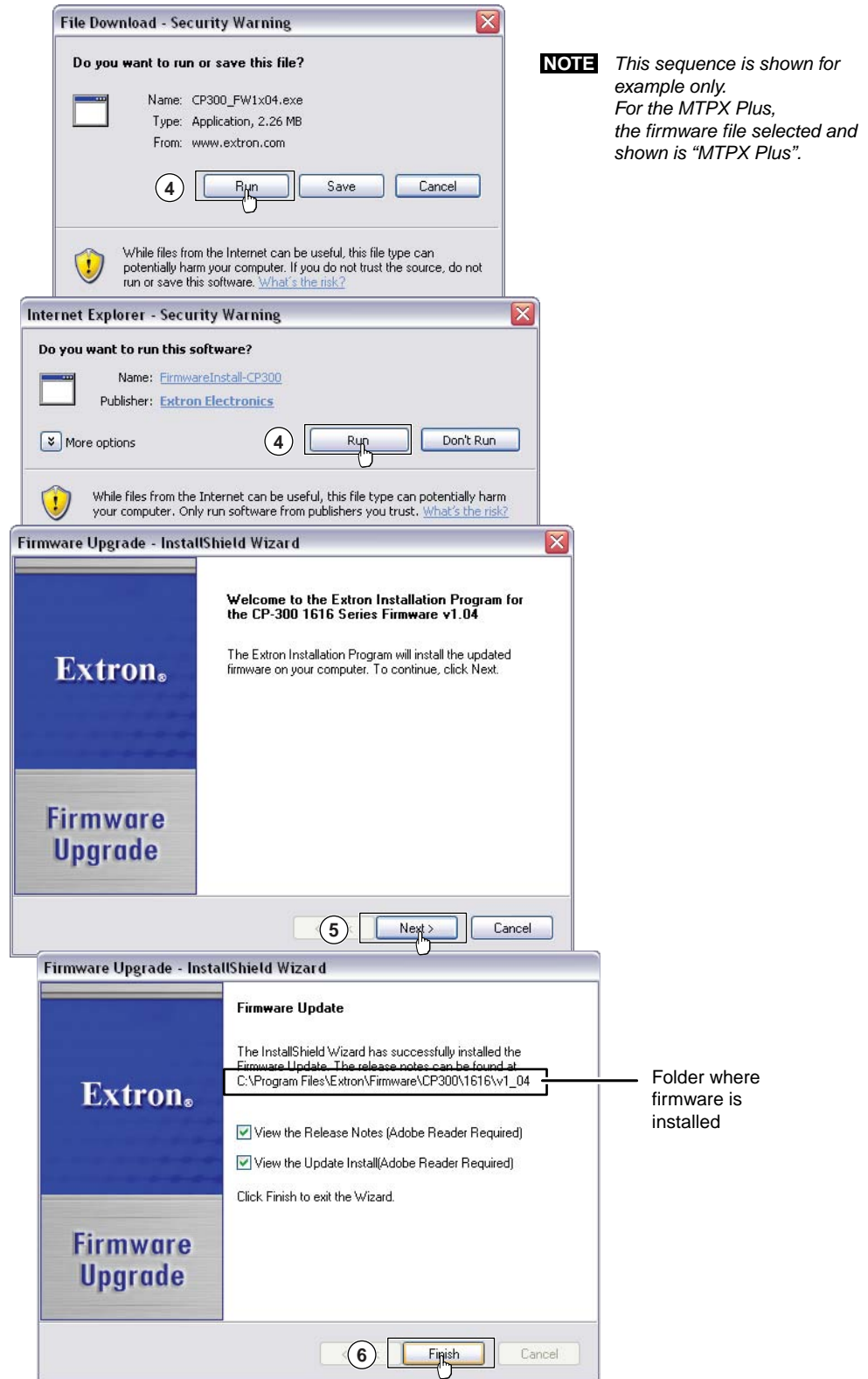


Figure 5-10 — Downloading firmware upgrade files

Matrix Software, cont'd

7. Connect a Windows-based computer to either switcher serial port or the switcher LAN port. See chapter 2, "Installation", for more details.
8. Start the Matrix Switchers Control Program and connect to the matrix switcher. See "Using the Matrix Switcher Control software" in this chapter, steps 1 through 4, starting on page 5-4.
9. Click **Tools > Update Firmware...**

If the switcher is connected via the LAN port, the select file window appears (figure 5-11). See "Ethernet-connected firmware upload", below.

If the switcher is connected via either serial port, the Extron Firmware Loader appears (figure 5-12). See "Serial-port-connected firmware upload", on page 5-15.

Ethernet-connected firmware upload

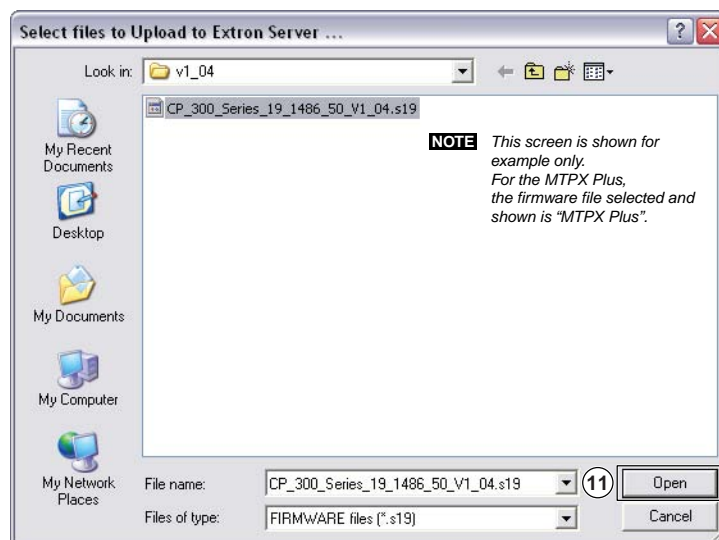


Figure 5-11 — Select file window

10. Navigate to the folder where you saved the firmware upgrade file. Select the file.

CAUTION Valid firmware files must have the file extension ".S19". Any other file extension is **not** a firmware upgrade.

NOTE The original factory-installed firmware is permanently available on the MTPX Plus switcher. If the attempted firmware upload fails for any reason, the switcher automatically reverts to the factory-installed firmware.

11. Click the **Open** button. The software advises you that you are about to reprogram the switcher's firmware. Click **OK** to continue.

A status window, which shows the progress of the upload, appears. The firmware upload to the MTPX Plus switcher may take a few minutes.



Serial-port-connected firmware upload

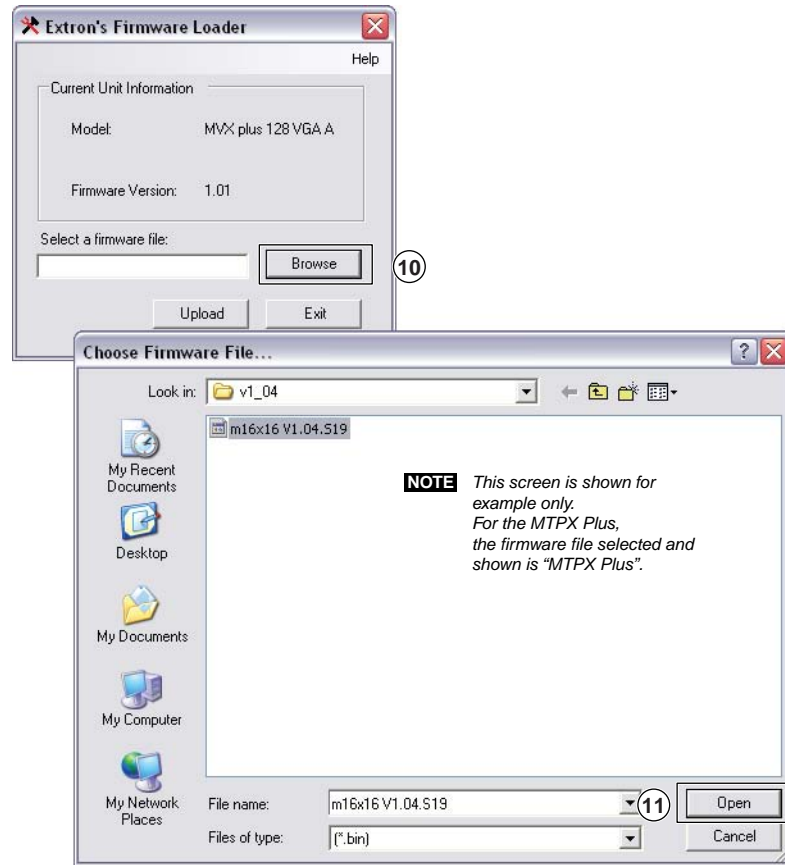


Figure 5-12 — Firmware loading

10. Click **Browse**. The open file window appears.
11. Navigate to the folder where you saved the firmware upgrade file. Select the file and click **Open**. The Firmware Loader returns to the top.

CAUTION Valid firmware files must have the file extension “.S19”. Any other file extension is **not** a firmware upgrade.

NOTE The original factory-installed firmware is permanently available on the MTPX Plus switcher. If the attempted firmware upload fails for any reason, the switcher automatically reverts to the factory-installed firmware.

12. Click **Upload**. The File Loader advises you that using the Ethernet (LAN) port is preferred over using either serial port (figure 5-13).

To quit the firmware upload and start over using the LAN port, click the **Cancel** button and return to step 7. Use the LAN port connection in step 7.

To continue the firmware upload using either serial port connection, click the **OK** button. The program prompts you to identify the serial port to which you are connected. Continue to step 13.

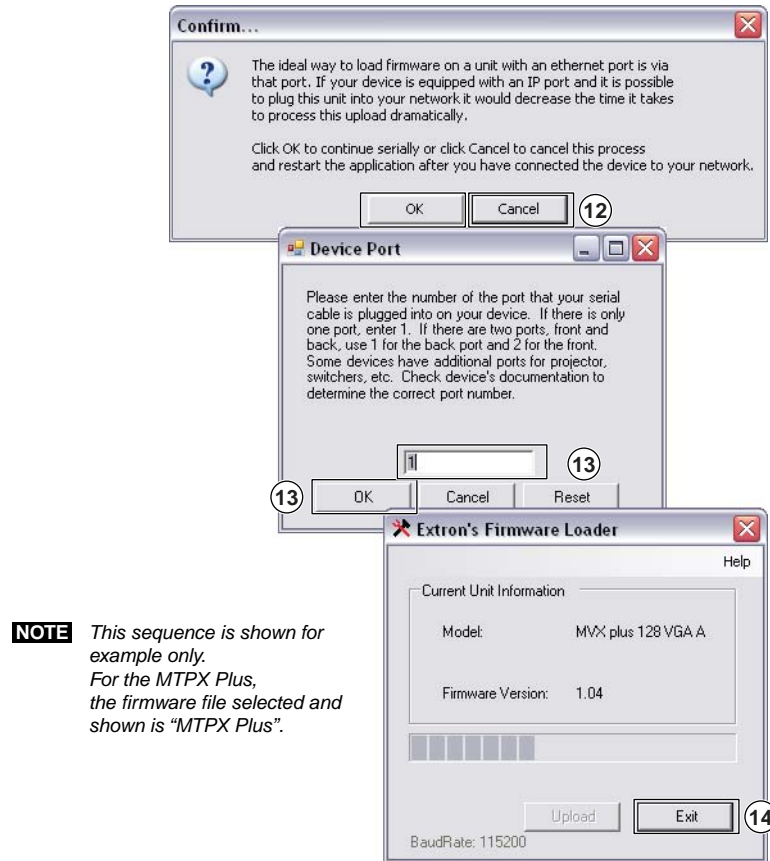


Figure 5-13 — Confirm window

13. If necessary, change the port number in the device port field:

- Rear panel RS-232/RS-422 port, enter 1.
- Front panel Configuration port, enter 2.

Click the **OK** button. The Firmware Loader reports, *"This process could take several minutes. Please wait..."*, then displays a status bar that shows the progress of the upload. When the upload is complete, the Firmware Loader reports *"Unit resetting, this can take some time, please wait. ..."*, and then *"Transfer complete!"*.

NOTE Firmware upgrades using either serial port can take several minutes.

14. When the Firmware Loader reports, *"Transfer complete!"*, click the **Exit** button on the Firmware Loader and then again on the port configuration window. The Firmware Loader and the Matrix Switchers Control Program exit.

Uploading HTML files

You can create customized HTML pages for the switcher to display. The HTML Files List window (figure 5-14) provides a way to view the contents of the switcher's file system and to upload custom HTML pages to the switcher.

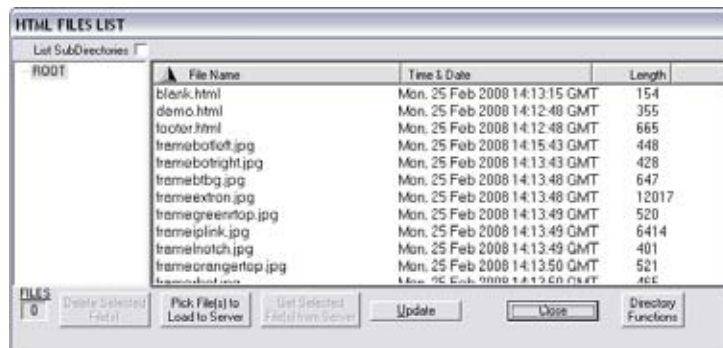


Figure 5-14 — HTML Files List window

Upload HTML pages as follows:

NOTE The files listed in figure 5-14 are shown for example only and may not be present on your switcher.

NOTE The HTML Files List window is for inserting your custom HTML pages. This is **not** the window to replace the firmware that controls all switcher operation. See “Updating firmware”, earlier in this chapter, to replace the firmware.

NOTE The following characters are invalid in file names:
{space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.

1. Connect the PC to the MTPX Plus switcher via either serial port or the LAN port.
2. Start the Matrix Switchers Control Program and connect to the MTPX Plus switcher. See “Using the Matrix Switcher Control software”, steps 1 through 4, starting on page 5-4.
3. Click on **Tools > HTML File Manager**.
4. Click the **Pick File(s) to Load to Server** button. An open file window appears.
5. Navigate to the folder where you saved the HTML file(s). Select the file(s).

NOTE To select multiple files, hold the Ctrl key while you select the desired files.

NOTE If you want one of the custom HTML files that you created to be the default start-up page, name the file “index.html”. The MTPX Plus switcher looks for that file name when you first connect to it using an Internet browser.

6. Click the **Open** button. The file(s) upload to the MTPX Plus switcher may take a few minutes.
7. Click the **Update** button to confirm the upload.
8. Click the **Close** button to exit the HTML Files List window.

Matrix Software, cont'd

Windows buttons, drop boxes, and trashcan

The buttons, drop boxes, and trash can on the right side of the program window perform the following functions:

Power — Unavailable for MTPX Plus Twisted Pair switchers, because the switcher power cannot be controlled via software.

Executive Mode — Allows you to lock out front panel operations, except for the view-only mode functions. Click the button to cycle between *Lock mode 0* (the indicator is white), *Lock mode 1* (the indicator displays red), and *Lock mode 2* (orange).

NOTE See “Setting the front panel locks (Executive modes)” in chapter 3, “Operation” for more information on the Lock modes.

Room menu — Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.

NOTE A *Room* is a subset of outputs that are logically related to each other, as determined by the operator. The MTPX Plus switcher supports up to 10 *rooms*, each of which can consist of from 1 to 16 outputs.

Presets menu — Displays a list of up to 32 global presets and up to 100 room presets. You can select a preset from the list to display it in the window and either activate it (**Go**) or delete it (**Delete**).

Go — Activates the selected preset as the current configuration.

Save as ... — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.

Delete — Allows the current preset to be deleted.

Changes – Take — Saves any changes made to the displayed configuration.

Changes – Cancel — Abandons any changes made to the displayed configuration.

Trash can — Drag and drop from an input or output button to the trash can to unmake all ties associated with that input or output.



Windows menus

File menu

Save matrix settings as ... — Saves a complete set of up to 32 global and 100 room presets, plus the last active setting (preset #0), to a file. Saved settings include audio gain and volume settings, MTPX configuration and picture settings, assigned icons, and icon captions.

Restore matrix settings from ... — Loads and activates a previously saved setting file.

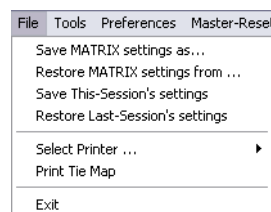
Save this-session's settings — Saves the current assigned icons and icon captions.

Restore last-session's settings — Loads the icons and icon captions that were saved during the last session. If you saved the previous session's changes to disk the last time you exited the program, the ties from that session are also loaded.

Select printer — Selects the target printer.

Print tie map — Prints the tie set that is displayed on the screen.

Exit — Closes the Matrix Switchers Control Program.



Tools menu

Assign device icons — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.

Edit device palette — Allows you to add your own custom device icon graphics.

Audio-Input gain settings — Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the magnitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.

Audio-Output volume settings — Displays the audio output level setting for a single input or for all inputs and allows you to change it. The level is expressed as a percentage of the input audio volume that is applied to the output; 0% is full attenuation (audio is silent), 100% is full volume.

Mute-Output settings — Displays the Volume and Mute Adjust screen, which allows you to mute and unmute individual or all audio or RS-232 outputs.

MTPX configuration settings — Displays the MTPX Configuration Settings window (figure 5-15), which allows you to define the content of the audio/RS-232 input, enable the RS-232 output inserts, and tailor the output sync.

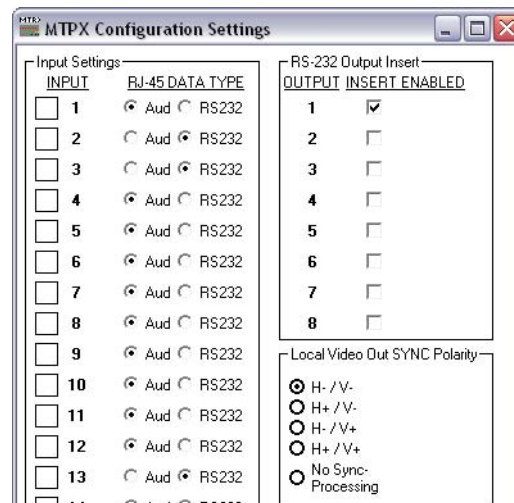
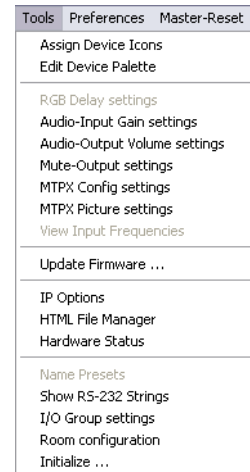


Figure 5-15 — MTPX Configuration Settings Window

Matrix Software, cont'd

MTPX Picture settings — Displays the MTPX Picture Settings window (figure 5-16), which allows you to set the input picture adjustments (level/peaking and skew) and the output picture adjustments (pre-peaking and skew). The Auto-Calibrate Level/Peaking button lets you use the included MTP signal generator to automatically set the input level/peaking. See “Optimizing the Video” on page 5-24.

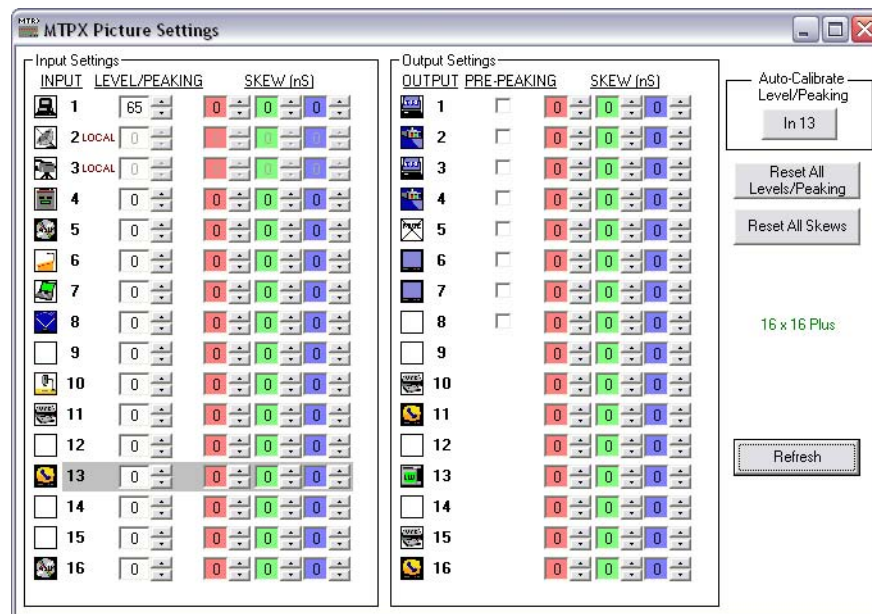


Figure 5-16 — MTPX Picture Settings window

Update firmware — Allows you to replace the firmware that is coded on the switcher’s control board without taking the switcher out of service. See “Updating firmware” on page 5-12.

IP options — Allows you to set IP options. See “IP Settings/Options window” on page 5-6.

HTML file manager — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a PC connected to the switcher. See “Uploading HTML files” on page 5-17.

Hardware status — Provides an overall view of the status of the matrix switcher, including the power supply voltages, the temperature status, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (figure 5-17).

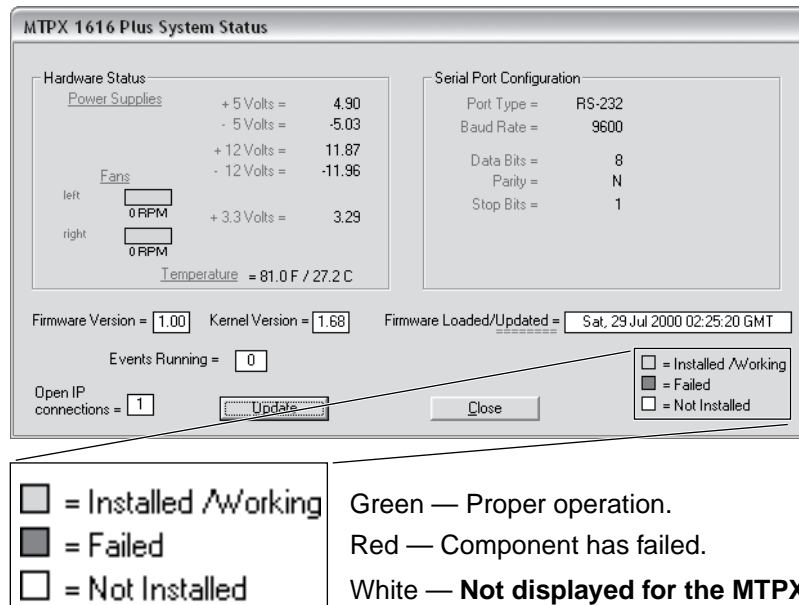


Figure 5-17 — Status window

Name presets — Allows you to assign a name to each of the 32 memory presets.

NOTE Preset names are limited to 12 upper- and lower-case alphanumeric characters, space, and the _ and / characters. The following characters are invalid in preset names: + ~ , @ = ' [] { } < > ' " ; : | \ and ?.

Show RS-232 strings — Displays the RS-232 commands that are used by the current configuration. You can refer to these for SIS programming.

I/O Group settings — Displays the inputs/outputs groups window, which allows you to assign inputs and outputs to any one of four groups (or no group).

Initialize — Initializes and clears any or all of the following: ties, presets, audio configuration, preset names, icon names, and icons.

Audio-input Configuration selection

Audio-input-Config

Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the magnitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.

Matrix Software, cont'd

Preferences menu

Immediate Changes — Causes configuration changes to take effect immediately.

Hold/Verify Changes — Delays implementation of configuration changes until the Changes – **Take** button is pressed.

Ties as Lines — Displays ties as lines (figure 5-18).

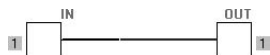


Figure 5-18 — Ties shown as lines

Ties as Crosspoints — Displays ties as a matrix of inputs and outputs (figure 5-19). Ties that have been made are indicated as **amber** (video and audio), **green** (video only), and **red** (audio only) boxes. Ties that will take effect when you click the **Take** button are indicated by +. Ties that will be broken when you click the **Take** button are indicated by –.

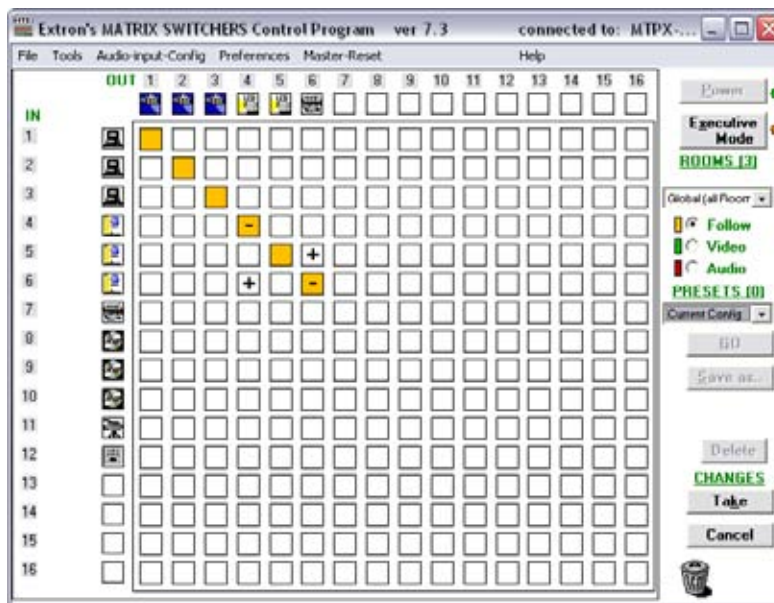


Figure 5-19 — Ties shown as crosspoints

Limit ties to same group — Allows you to limit the creation of ties using the program to inputs and outputs that are in the same group (similar to front panel operation).

Icons in I/O boxes — Erases any numbers in the I/O boxes in the Control Program window (figure 5-6). You can place icons in the boxes.



Numbers in I/O boxes — Erases any icons in the I/O boxes in the Control Program window and fills each box with the associated input or output number.



Catch FPC/others changes — When checked, sets the switcher to report all configuration and setting changes to the serial port or Ethernet connection that turned this selection on. These reports allow the Matrix Switchers Control Program to track the changes that occur in the switcher's configuration and settings, whether commanded via the front panel, the either serial port, or the Ethernet port.

Master-Reset selection

Master-Reset

Master reset clears all ties and presets, all audio or RS-232 mutes, resets all I/O grouping, sets all input audio levels to unity gain (+0 dB), and sets all output volume levels to 100% (0 dB of attenuation).

NOTE *Master reset does not reset the Internet protocol (IP) settings.*

Using *Emulation* mode

Emulation mode allows you to set up the software without attaching the switcher to the computer. To use *Emulation* mode, do the following:

1. Click **Start > Programs > Extron Electronics > Matrix Switchers > MATRIX Switcher + Control Pgm**
2. Choose **Emulate**, and click **OK**.
3. Choose an emulation file to open, and click **OK**. The file DEMO.MTX provides a sample of a completed matrix setup. Selecting the file NEW.INI or clicking **Cancel** provides a blank setup to get you started.
4. Enter the file name under which you want to save any changes to the file, and click **OK**.
5. Select the number of video boards, audio boards, and matrix model for which you are preparing a configuration, and click **OK**.
6. Continue using the program as described starting on page 5-4.

Using the help system

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click on the MATRIX Switcher+ Help icon (shown at right).
- From within the Matrix Switchers Control Program, click on the **Help** menu on the main screen.
- From within the Matrix Switchers Control Program, press the F1 key.



Optimizing the Video

Each TP input has a level and peaking adjustment. Most MTP transmitters and half of the MTPX Plus TP outputs have a pre-peaking feature. TP inputs and outputs have skew adjustments. Set these adjustable features as follows for the best image quality:

NOTE For all of the settings in this section (with the exception of the **transmitter's** Pre-Peak switch in step 1), see the MTPX Pictures settings and MTPX configuration settings menu items in "Tools menu", on page 5-19.

These settings can also be made using SIS commands or the built-in HTML pages. See chapter 4, "Programmer's Guide" and chapter 6, "HTML Operation".

NOTE Unless the TP cables are changed, these adjustments should need to be made only once, during installation.

Before you start optimizing, set all input level and peaking, input and output skew, and output pre-peak settings to either zero or off.

MTP transmitter Pre-Peak selection

For inputs from MTP T 15HD products only — If the cable between the MTP transmitter and the MTPX Plus is $\geq 300'$, turn the transmitter's Pre-Peak switch on. For shorter cables, turn the switch off.

MTPX level/peaking setting

The simplest and surest way to set the input level/peaking is to use the included MTP signal generator and the Auto-calibration utility within the Matrix Switchers Control Program as follows:

NOTE To manually set the input level/peaking, proceed to step 8.

1. Disconnect the power and RJ-45 cables at the MTP transmitter connected to the input to be adjusted.
2. Connect the two cables to the included MTP signal generator.
3. If the input cable between the transmitter and the MTPX Plus is longer than 300' (90 m), place the MTP signal generator's Pre-Peak switch on (figure 5-20).

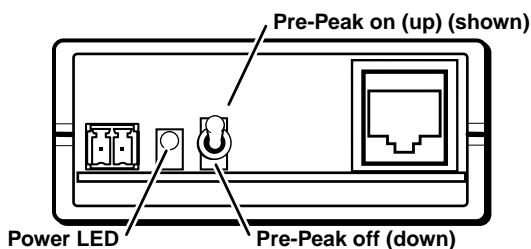
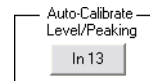


Figure 5-20 — MTP signal generator

4. In the Matrix Switchers Control Program, click **Tools > MTPX Picture settings** to open the MTPX Picture Settings window (figure 5-16 on page 5-20).
5. Click the **Auto-Calibrate Level/Peaking** button.

After a few moments, the program reports whether or not the calibration succeeded and the original and new settings for the input Pre-Peaking adjustment.



-
6. Disconnect the Power and RJ-45 cables from the MTP signal generator and reconnect them to the MTP transmitter.
 7. Repeat steps 1 through 6 for each input.

If, for any reason, you choose **not** to auto calibrate, or if you want to fine tune the adjustment, you can manually set the values as follows:

8. Connect an oscilloscope (preferred) or a monitor (acceptable) to local output (VGA output) 1.
9. **If using an oscilloscope**, apply a white field test pattern to the input to be optimized via an MTP transmitter.

If using a monitor, apply a grayscale or Color Bars test pattern to the input to be optimized via an MTP transmitter.

HINT The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

10. Tie the input to be optimized to output 1.
11. Observe the oscilloscope or the monitor with a critical eye while you adjust the input level/peaking setting to compensate for signal loss between the transmitter and the MTPX.
12. If necessary, repeat steps 8 through 11 for each input.

MTPX skew setting

The MTPX has skew adjustments on the inputs and the outputs. Both should be set to compensate for signal skew across all ties. Adjust input and output skew as follows:

Inputs:

1. Connect an oscilloscope (preferred) or a monitor (acceptable) to local output (VGA output) 1.
2. Apply a crosshatch test pattern to the input to be optimized via an MTP transmitter.

HINT The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

3. Tie the input to be optimized to output 1.
4. Use the test equipment or examine the displayed video image with a critical eye to determine which video signal — red, green, or blue — is most shifted to the left.
5. Adjust the leftmost video signal to the right until all three colors are properly converged.

NOTE When the skew adjustment is set to zero, the MTPX Plus cannot shift the rightmost video image to the left.

NOTE A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.

6. If either of the two the remaining colors is left shifted, repeat steps 4 and 5.
7. Repeat steps 2 through 6 for all other inputs.

Outputs:

8. Connect an oscilloscope (preferred) or a monitor (acceptable) to the TP output to be adjusted, via an MTP receiver.
9. Apply a crosshatch test pattern to one the local (VGA) inputs.

HINT The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

10. Tie the local input receiving the test pattern signal to the output to be optimized.
11. Use the test equipment or examine the displayed video image with a critical eye to determine which video signal — red, green, or blue — is most shifted to the left.
12. Adjust the leftmost video signal to the right until all three colors are converged.

NOTE When the skew adjustment is set to zero, the MTPX Plus cannot shift the rightmost video image to the left.

NOTE A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.

13. If either of the two the remaining colors is left shifted, repeat steps 11 and 12.
14. Repeat steps 9 through 13 for all other outputs.

MTPX Plus Pre-Peak selection

NOTE MTPX Pre-Peak is available on the first 25% of the MTPX Plus outputs (for example, outputs 1 through 4 for an MTPX Plus 168).

If the cable between the MTPX Plus and the receiver is > 300', turn the MTPX Plus's Pre-Peak feature on. For shorter cables, turn the feature off.

MTP Receiver level/peaking setting

If level/peaking is available on the connected receiver(s), adjust it as follows:

1. If using an oscilloscope, apply a white field test pattern to one the local (VGA) inputs on the MTPX Plus (figure 5-21).

If using a monitor, apply a Color Bars test pattern to one the local (VGA) inputs on the MTPX Plus.

HINT The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

2. Tie the local input receiving the test pattern signal to the output connected to the MTP receiver to be optimized.

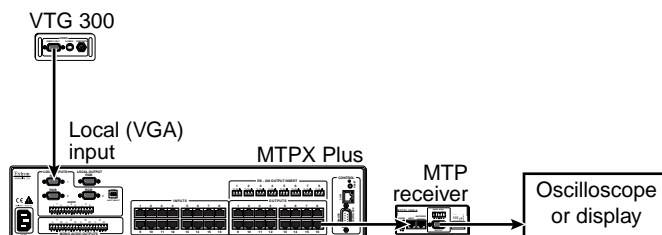


Figure 5-21 — Connections for setting the receiver's level/peaking

3. Connect an oscilloscope or monitor to the output of the MTP receiver.
4. Adjust the receiver's level/peaking in accordance with the applicable MTP product manual.
5. Repeat steps 2 through 4 for each receiver to be optimized.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space (spaces **are** ok for names)} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:)| \ and ?.

Button-Label Generator Program

The Button Label Generator software creates labels that you can place in the translucent covers of the input and output selection buttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection. See appendix B, "Reference Information", for the procedure for removing and replacing the translucent covers.

The Extron Button Label Generator is available on the Extron Web site, www.extron.com, under the **Download Center** tab. Click the **Software** link (figure 5-22), and download and install the program.

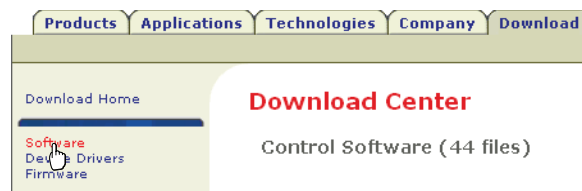


Figure 5-22 — Location of software on the web site

NOTE The Button Label Generator software is also included on the Extron Software Products CD-ROM that accompanied the switcher.

By default, the Windows installation creates a C:\Program Files\Extron\ButtonLabelGenerator directory and places the Button Label Generator icon into a group or folder named "Extron Electronics".

Matrix Software, cont'd

Using the Button-Label Generator software

1. To run the Button-Label Generator program, click **Start > Programs > Extron Electronics > Button Label Generator > Button Label Generator**. The Button-Label Generator window appears (figure 5-23).

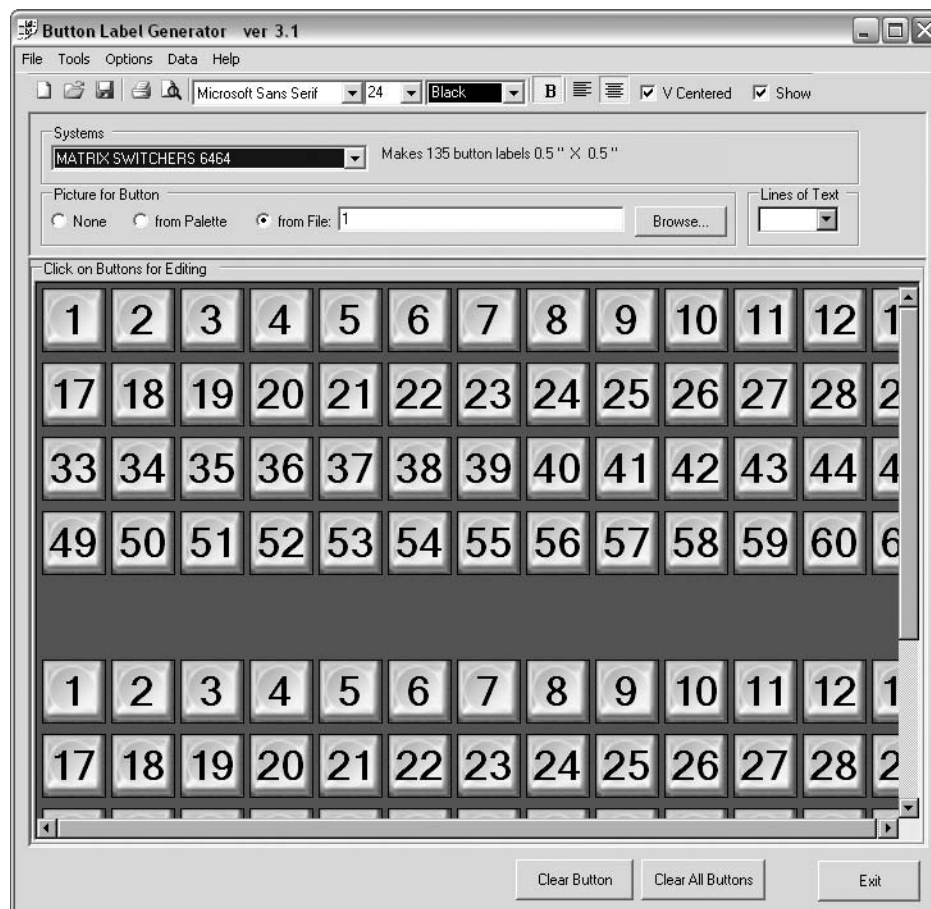


Figure 5-23 — Extron's Button-Label Generator window

2. In the Systems selection box, choose the Matrix Switchers 6464 option to match the button label size and quantities for your MTPX Plus switcher.
3. Using normal Windows controls, you can create and print labels that can be placed in the label windows on the front panel of the switcher.

NOTE For best results, print on transparent or translucent material.

4. Click the **Clear All Buttons** button and create new labels as many times as necessary to make all of the button labels that you need.

To access the help program, click the **Help** menu.



MTPX Plus Twisted Pair Matrix Switchers

6

Chapter Six

HTML Operation

Download the Startup Page

System Status Page

System Settings Page

File Management Page

User Control Page

Special Characters

HTML Operation

The switcher can be controlled and operated through its LAN port, connected via a LAN or WAN, using a web browser such as Microsoft's Internet Explorer. The browser's display of the switcher's status or operation has the appearance of web pages. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. In Microsoft's Internet Explorer, click **Tools > Internet Options > Connections > LAN Settings**, uncheck the **Use a proxy server...** box, and then click **OK**.*

Download the Startup Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Enter the Matrix IP address in the browser's Address field.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the file name to open.

NOTE *The browser's Address field should display the address in the following format: xxx.xxx.xxx.xxx/{optional_file_name.html}*

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

If the switcher is not password protected, it checks and downloads the HTML pages (proceed to step 7).

If the switcher is password protected, the switcher downloads the Enter Network Password page (figure 6-1).



Figure 6-1 — Enter Network Password page

NOTE *A User name entry is not required.*

6. Click in the **Password** field and type in the appropriate administrator or user password. Click the **OK** button.

7. The switcher checks several possibilities, in the following order, and then responds accordingly:
 - a. Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher downloads that HTML page.
 - b. Is there a file in the switcher's memory that is named "index.html"? **If so**, the switcher downloads "index.html" as the default startup page.
 - c. **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page, "nortxe_index.html" (figure 6-2), also known as the System Status page.

System Status Page

The System Status page (figure 6-2) provides an overall view of the status of the matrix switcher, including individual voltages, and the serial port status. The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the **Status** tab.

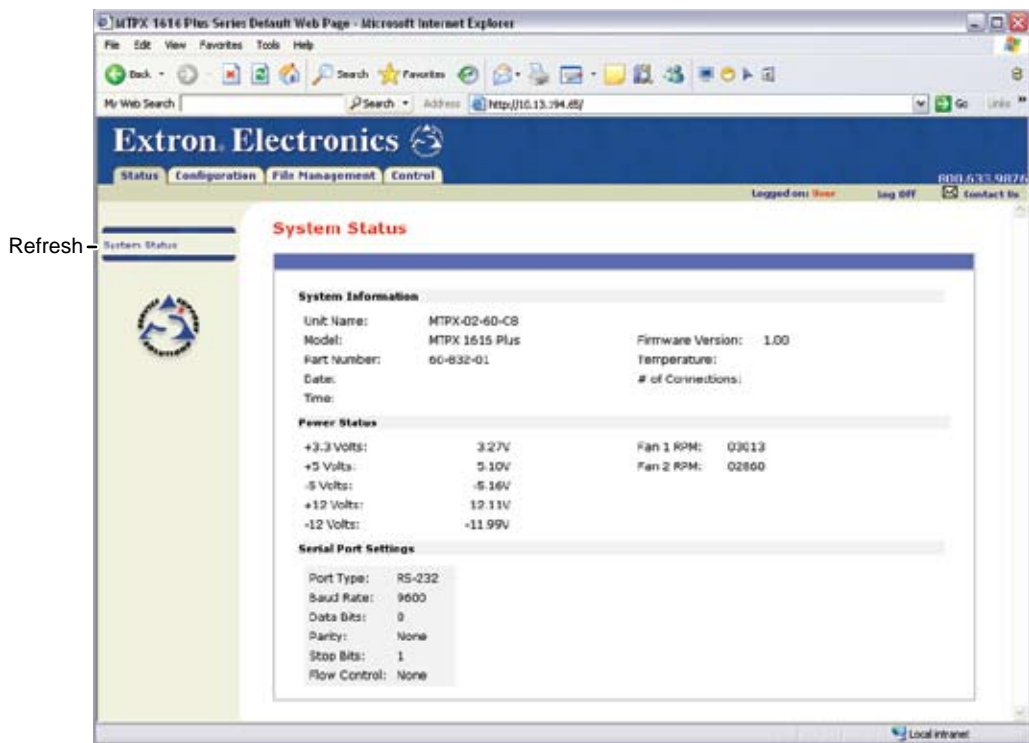


Figure 6-2 — System Status page

The status web page periodically updates itself to reflect the latest status of the switcher components. If a value changes, the display shows the change in status the next time it updates.

HTML Operation, cont'd

System Settings Page

The MTPX Plus switcher downloads the System Settings page (figure 6-3) when you click the **Configuration** tab. The screen consists of fields in which you can view and edit IP administration and system settings. You can access the Email Settings and Passwords pages by clicking the appropriate link. See appendix A, “Ethernet Connection”, for basic information about IP addresses and subnetting.

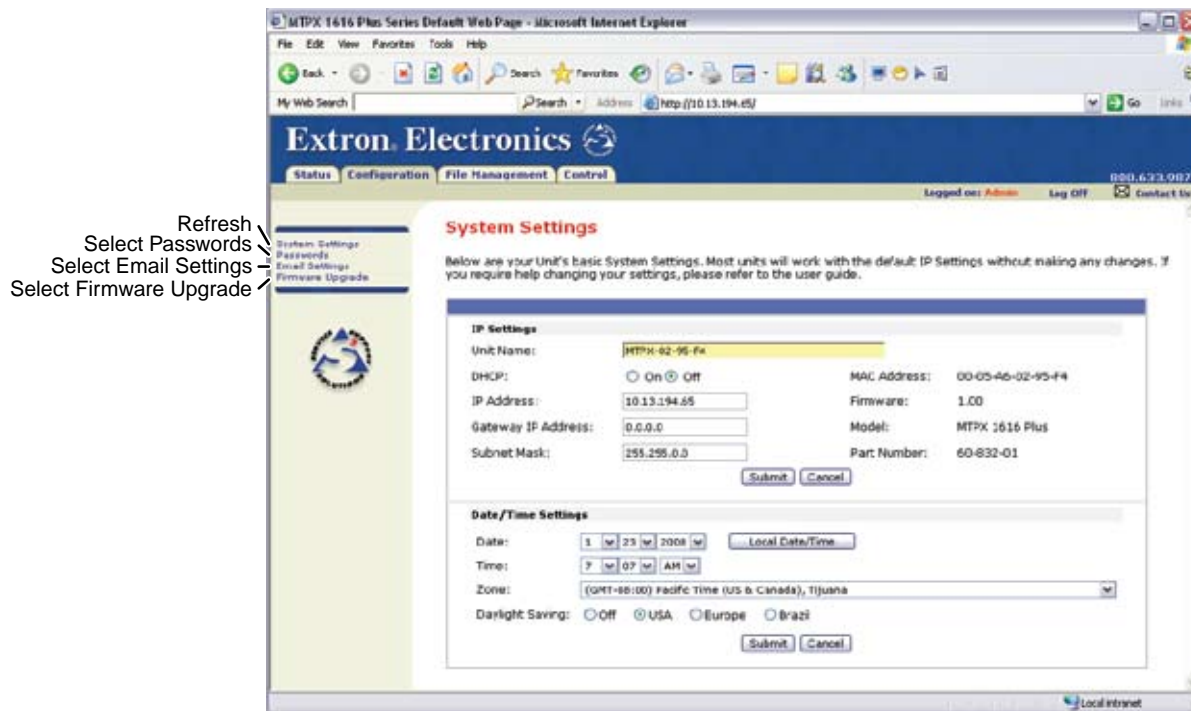


Figure 6-3 — System Settings page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, set audio or RS-232 mutes, and view all settings with the exception of passwords.

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button at the bottom of the page.

Unit Name field

The Unit Name field contains the name used as the “from” information when the switcher e-mails notification of its failed or repaired status. This name field can be changed to any valid name, up to 24 alphanumeric characters.

NOTE The following characters are invalid in the matrix name:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.

DHCP radio buttons

The **DHCP On** radio button directs the switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The **DHCP Off** radio button turns DHCP off. Contact the local system administrator to determine if DHCP is appropriate.

IP Address field

The IP Address field contains the IP address of the connected switcher. This value is encoded in the switcher's flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you should ask your network administrator for a new, valid address.

NOTE *IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.*

Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the switcher and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The Subnet Mask field is used to determine whether the switcher is on the same subnet as the mail server when you are subnetting. For more information, see "Subnetting — A Primer", in appendix A, "Ethernet Connection".

MAC Address field

The Media Access Control (MAC) Address is hardcoded in the switcher and cannot be changed.

Firmware field

The Firmware field identifies the installed firmware version. This field is hardcoded in the switcher and cannot be changed.

Model field

The Model field identifies the number of video and audio inputs and outputs. This field is hardcoded in the switcher and cannot be changed.

Part Number field

The Part Number field identifies the part number of your switcher. This field is hardcoded in the switcher and cannot be changed.

HTML Operation, cont'd

Date/Time Settings fields

The Date/Time Settings fields (figure 6-4) provide a location for viewing and setting the time functions.

The screenshot shows a web form titled "Date/Time Settings". It includes the following elements:

- Date:** Three dropdown menus for month (11), day (14), and year (2005).
- Time:** Two dropdown menus for hour (2) and minute (35).
- Zone:** A dropdown menu currently showing "(GMT-08:00)". A scrollable list of years from 2005 to 2015 is visible next to it.
- Daylight Savings:** Three radio buttons labeled "Off", "Europe", and "Brazil".
- Buttons:** "Submit" and "Cancel" buttons at the bottom right.

Figure 6-4 — Date/Time Settings fields

Change the date and time settings as follows:

1. Click the desired value's drop box. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the year drop box is selected in figure 6-4).
2. Click and drag the slider or click the scroll up ▲ button or the scroll down ▼ button until the desired value is visible.
3. Click the desired value.

NOTE If setting the time, set the local time. The **Zone** variable allows you to then enter the offset from Greenwich Mean Time (GMT).

NOTE The **Zone** field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

4. Repeat steps 1 through 3 for other variables that need to be changed.
5. If appropriate, select the appropriate **Daylight Savings** radio button to turn on the daylight savings time feature for your region or nation.

NOTE When Daylight Savings Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Savings Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Savings Time is turned off, the switcher does not adjust its time reference.

6. Click the **Submit** button.

Passwords page

Access the Passwords page (figure 6-5) by clicking the Passwords link on the System Settings page.

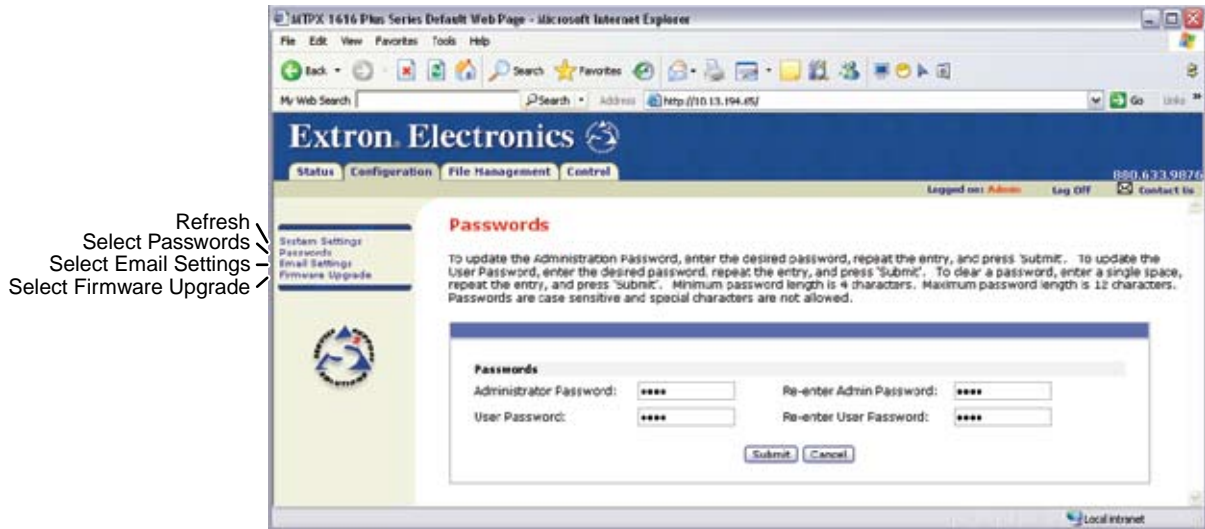


Figure 6-5 — Passwords page

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to up to 12 upper-case and lower-case alphanumeric characters. Each password must be entered twice; once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks (*****). If you do not want to password protect an access level, leave the Password field and the Re-Enter Password field blank. After entering the password in both fields, click the **Submit** button.

NOTE *An administrator password must be created before a user password can be created.*

To clear an existing password so that no password is required, clear any existing password, enter a single space character in the Password and Re-enter Password fields, and click the **Submit** button.

HTML Operation, cont'd

Email Settings page

Reach the Email Settings page (figure 6-6) by clicking the Email Settings link on the System Settings page. The Email Settings page has fields for setting up the switcher's e-mail notification capabilities. For the e-mail settings and for each row of the e-mail notification settings, click the **Edit** button to make the fields available for editing. The button changes to **Save**. After editing the settings associated with the **Edit/Save** button, click the **Save** button.

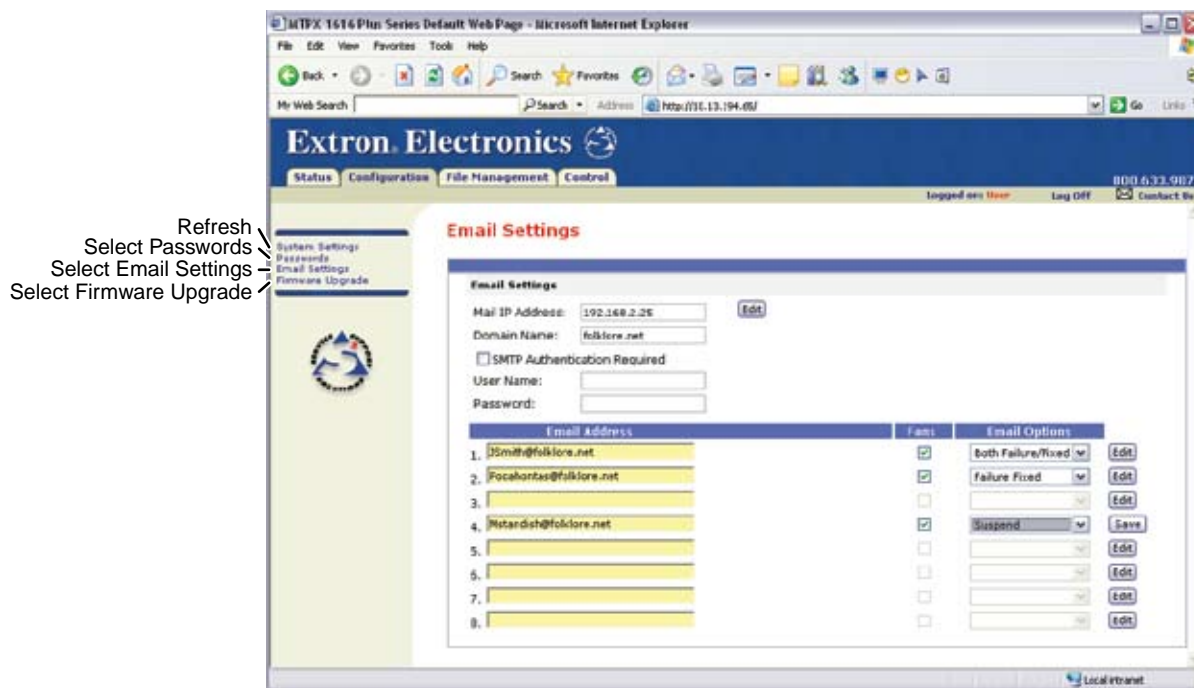


Figure 6-6 — Email Settings page

Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the mail server that handles the e-mail for the facility in which the switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

Setting up SMTP authorization

If desired, set the MTPX Plus to require SMTP authorization before accepting any e-mail as follows:

1. Click **Edit**. The button changes to Save.
2. Check the SMTP Authorization Required check box, located below the Domain Name field. This enables the User Name and Password fields below the check box.
3. Enter a user name and a password in the User Name and Password fields. For the MTPX Plus to accept their e-mail messages, senders must enter the user name and password.

NOTE For the User name, any combination of letters, numerals, spaces, and symbols except the comma (,) and the single and double quotation marks (' and ") can be used. For the password, all characters except the comma can be used. The user name and password can each be from 1 to 30 characters.

NOTE Both a user name and a password must be specified.

4. Click **Save** to save the user name and password.

To remove SMTP authorization, click Edit, click (deselect) the SMTP Authorization Required check box, then click Save.

Domain Name field

The Domain Name field displays the domain name that the MTPX Plus switcher uses to log on to the e-mail server. Standard domain name conventions (for example: xxx.com) apply.

NOTE The following characters are invalid in a domain name: {space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is acceptable only as the lead-in to the domain name (such as @folklore.net).

Email address fields

The eight Email address fields identify the e-mail addresses of the personnel to whom the MTPX Plus switcher e-mails notification of its failure and repair status. Standard e-mail address conventions (nnnnn@xxx.com) apply.

The Fans check boxes and drop boxes associated with each address field permit the operator to specify specific criteria under which the switcher will e-mail recipients. Check the Fans boxes to monitor the cooling. In the associated **Email Options** drop box, select whether the recipient is to be e-mailed of failures, fixes, both, not notified, or to be removed from the e-mail list. The **Suspend** option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation. Deleting an e-mail addressee and clicking the **Save** button removes the recipient from e-mail notification completely.

HTML Operation, cont'd

Firmware Upgrade page

The Firmware Upgrade page provides another way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service.. Access the Firmware Upgrade page (figure 6-7) by clicking the **Firmware Upgrade** link on the System Settings page.

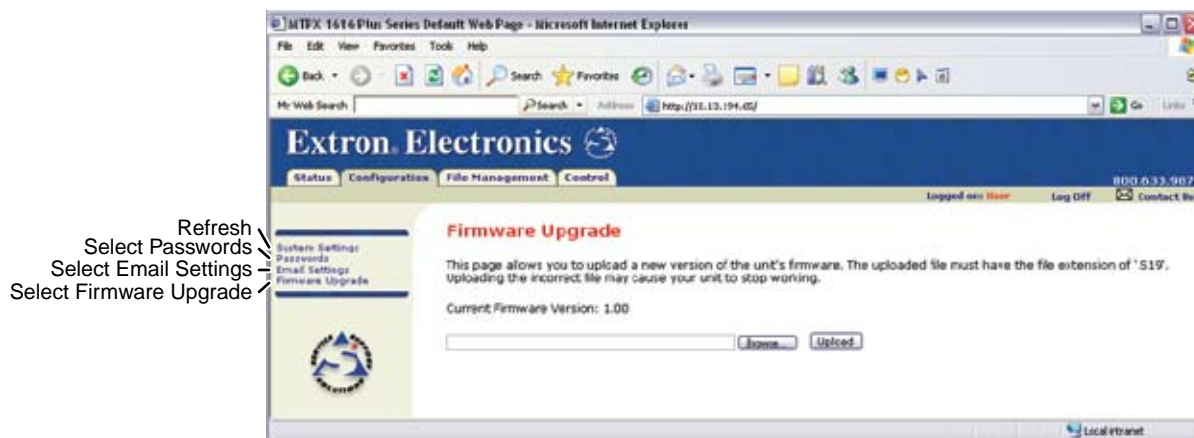


Figure 6-7 — Firmware Upgrade page

Update the switcher firmware as follows:

NOTE The Firmware Upgrade page is **only** for replacing the firmware that controls all switcher operation. To insert your own custom HTML pages, see “File Management Page”, on page 6-10.

1. Visit the Extron Web site, www.extron.com, select the MTPX product category, select the latest firmware installation package (*.exe file) for the switcher, and download the file. Note the folder to which you save the firmware file.
2. Run the executable (*.exe) file to decompress the firmware file.
3. Connect the PC to the MTPX Plus switcher via the switcher's LAN port.
4. Access the MTPX Plus switcher using HTML pages.
5. Click the **Configuration** tab.
6. Click the **Firmware Upgrade** link.
7. Click the **Browse** button. An open file window appears.
8. Navigate to the folder where you saved the firmware upgrade file. Select the file.

CAUTION Valid firmware files must have the file extension “.S19”. Any other file extension is **not** a firmware upgrade.

NOTE The original factory-installed firmware is permanently available on the MTPX Plus switcher. If the attempted firmware upload fails for any reason, the switcher automatically reverts to the factory-installed firmware.

9. Click the **Open** button.
10. Click the **Upload** button. The firmware upload to the MTPX Plus switcher may take a few minutes.

File Management Page

To delete files such as user-supplied HTML pages from the switcher or to upload your own files to the switcher, click the **File Management** tab. The switcher downloads the file management HTML page (figure 6-8).

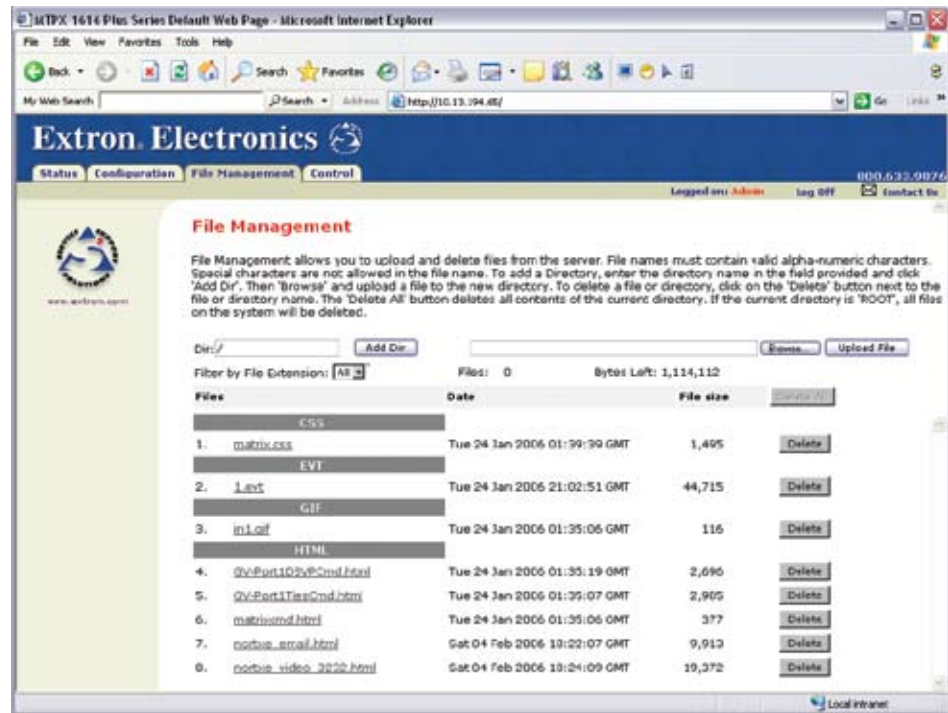


Figure 6-8 — File Management page

NOTE The files listed in figure 6-8 are shown for example only and may not be present on your switcher.

To delete a file, check the associated delete check box and click the **Delete Files** button.

Upload your own files as follows:

NOTE The following characters are invalid in file names:
{space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.

1. Click the **Browse** button.
2. Browse through your system and select the desired file(s).

NOTE If you want one of the pages that you create and upload to be the default startup page, name that file "index.html".

3. Click the **Upload File** button. The file(s) that you selected appear in the list.

HTML Operation, cont'd

User Control Page

You can create ties on the User Control page (figure 6-9). Access the User Control page by clicking the **Control** tab.

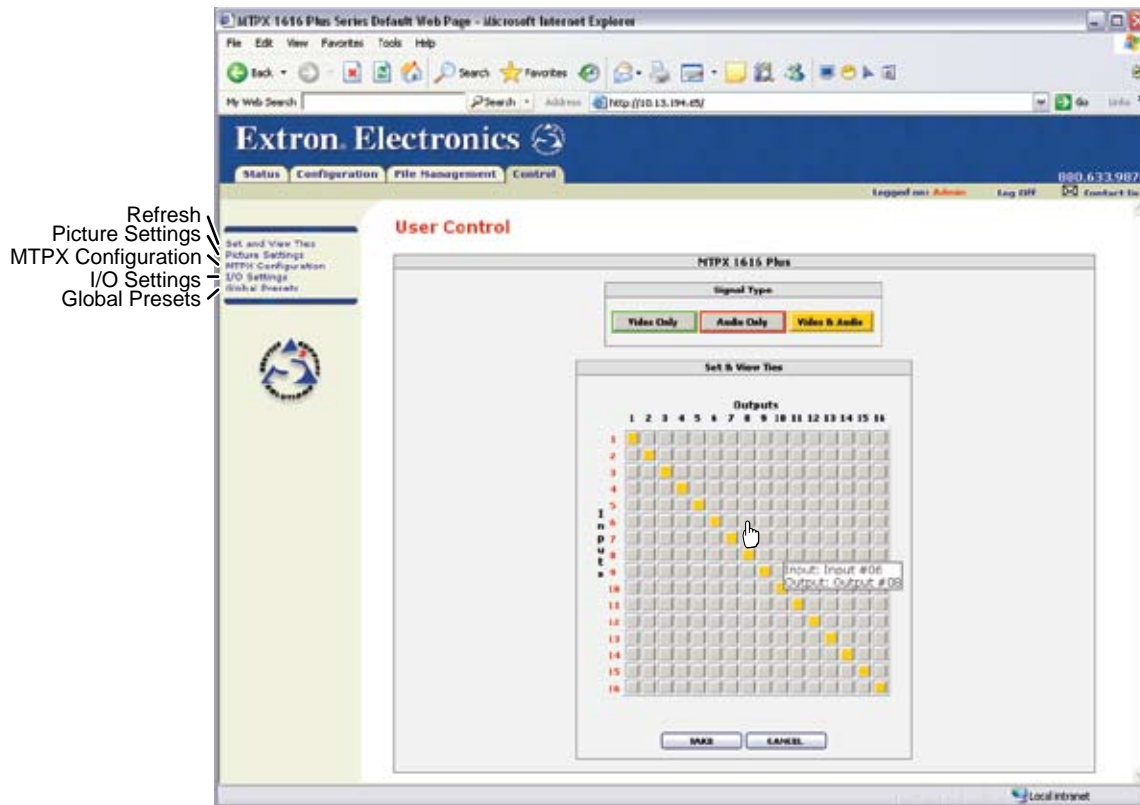


Figure 6-9 — User Control Ties page

The page consists of a matrix of input (rows) and output (columns) selection buttons of four different colors:

- The **amber** buttons indicate **video and audio ties**.
- The **green** buttons indicate **video only ties**.
- The **red** buttons indicate **audio only ties**.
- The **gray** buttons indicate **no ties**.

NOTE If you lose track of the input and output associated with a specific button, let the mouse pointer rest over a button for a moment. As shown in figure 6-9, a field pops up that identifies the input and output for that button.

Creating a tie

Select and switch an input as follows:

1. Click the **Video Only**, **Audio Only**, or **Video & Audio** button to select video, audio, or both for switching (audio follow or audio breakaway). Each mouse click on a button toggles the other two buttons off.
2. Move the mouse over the matrix of input and output selection buttons. Click a button to create a pending tie (if a tie does not exist) or pending untie (if a tie exists) of the input and output associated with that button. A "P" (for pending) appears in the button.

NOTE If you lose track of the input and output associated with a specific button, let the mouse rest over one of the tie buttons for a moment. A field pops up (as shown on figure 6-9) that identifies the input and output for that button.

NOTE To tie an input to all outputs, click that input's input number.

3. Click the **Take** button to make the configuration changes or the **Cancel** button to abandon the configuration changes.

Picture Settings page

The Picture Settings page provides a way to set the input level/peaking, the output pre-peaking, and the input and output skew settings. Access the Picture Settings page (figure 6-10) by clicking the **Picture Settings** link on the Control page.

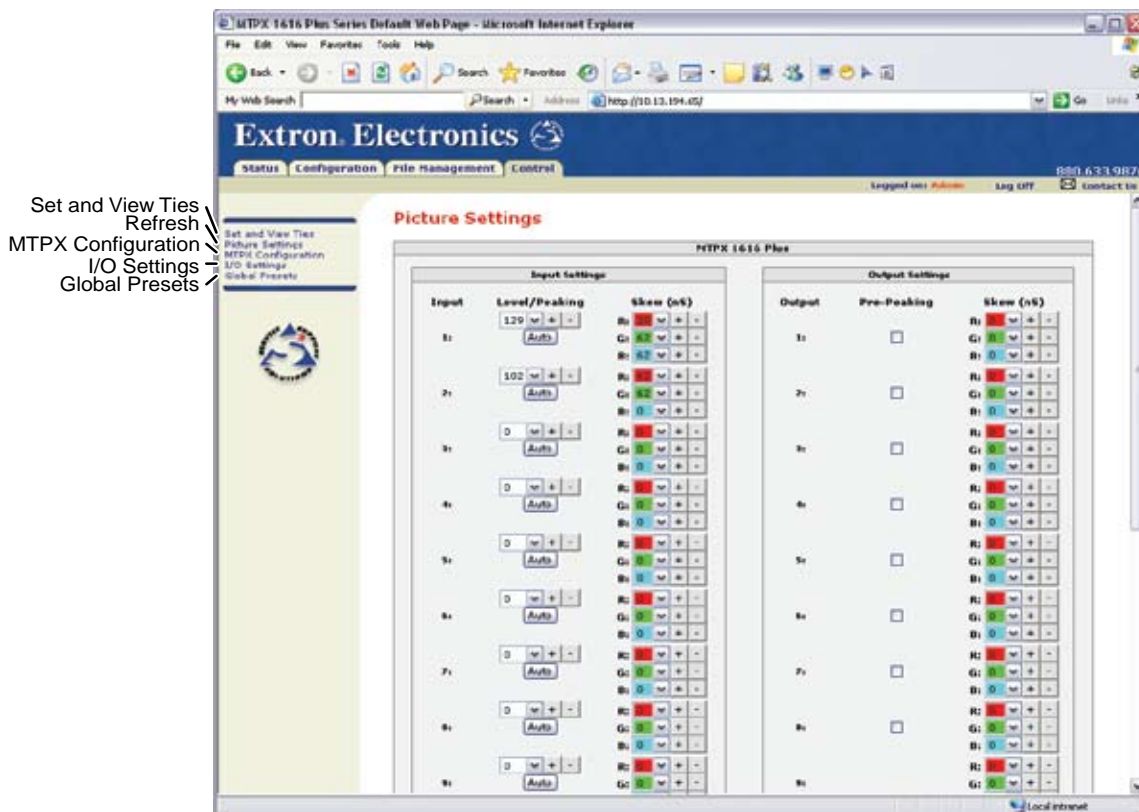


Figure 6-10 — Picture Settings page

HTML Operation, cont'd

Changing the input level/peaking

Users can set each input's level/peaking value (from 000 through 255) from the Picture Settings page. Level/peaking can be adjusted to compensate for longer cable runs on the inputs. Change an input's level/peaking setting in any of the following three ways:

- Use the auto calibration function as follows:
 1. Disconnect the power and RJ-45 cables at the MTP transmitter connected to input to be calibrated.
 2. Connect the two cables to the included MTP signal generator.
 3. If the input cable is longer than 300' (90 m), place the MTP signal generator's Pre-Peak switch on (up when the signal generator's RJ-45 connector is to the right [figure 6-11]). If the cable is shorter than 300' (90 m), place the switch down.

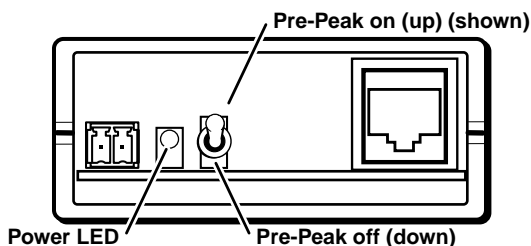
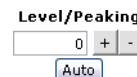


Figure 5-20 — MTP signal generator

4. Click the **Auto** button.
- Click the desired input's Level/Peaking up **+** button or down **-** button.
 - Directly enter a value into the Level/Peaking field.

HINT Watch a display as you make adjustments.



Toggling output pre-peaking on and off

Users can toggle each output's pre-peaking value on and off from the Picture Settings page. Click in the desired output's Pre-Peaking check box to toggle the pre-peaking feature on and off for that output. Pre-peak alters the TP signal output to correct for long cable runs. See the table on page 1-5 for recommended maximum transmission lengths.



Changing the skew

Users can individually set the red, green, and blue skew setting for each input and/or output from the Picture Settings page. The skew settings correct skew delay (misconvergence) problems commonly encountered when using Category (CAT) 5, 5e, or 6 twisted pair (TP) cables for RGB or component video transmission.

Change an input's or output's skew setting as follows:

NOTE For best results, set all three skew values to 0 ns (see steps 2a and 2b below) before adjusting for misconvergence.

1. Use UTP cable test equipment or examine the displayed video image with a critical eye to determine which video signal, red, green, or blue, is most shifted to the left.

NOTE A crosshatch test pattern is ideal for evaluating pair skew.

2. Monitor the displayed image. Increase the left-shifted video signal's skew setting 2 ns at a time as follows:

NOTE The skew compensation function **cannot** shift a video plane farther left than the 0 ns setting.

- a. Click drop box for the desired input or output and the desired video plane. A drop-down scroll box appears (figure 6-12).

NOTE The red video plane is selected in figure 6-12.

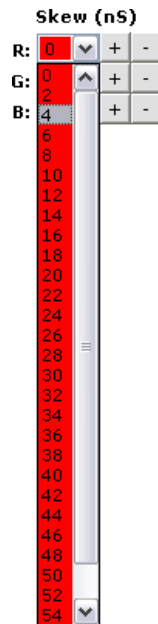






Figure 6-12 — Skew selection drop box

- b. Click and drag the slider or click on the scroll up  button or the scroll down  button until the desired value is visible.

NOTE A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.

NOTE As an alternative to step 2, or to watch a display as you make adjustments, click on the up  button or down  button.

3. If either of the other video signals is misconverged, repeat steps 2a and 2b.

MTPX Configuration page

The MTPX Configuration page provides a way to define the content of the audio/RS-232 input, enable the RS-232 output inserts, and tailor the output sync. Access the MTPX Configuration page (figure 6-13) by clicking the **MTPX Configuration** link on the Control page.

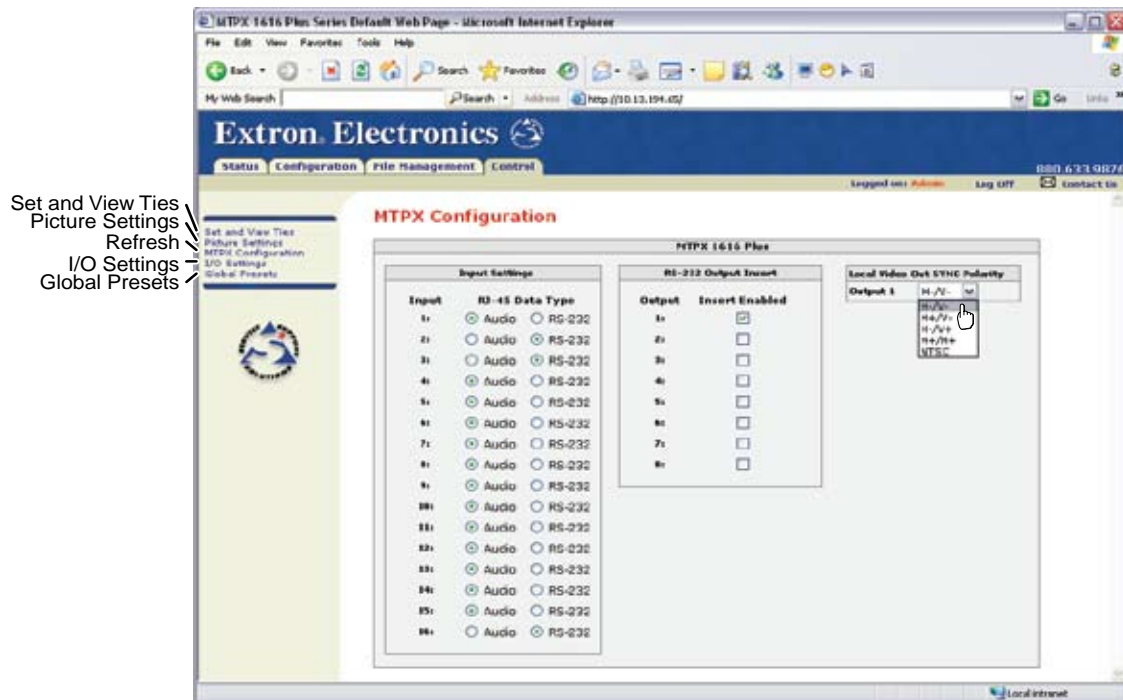


Figure 6-13 — MTPX Configuration page

I/O Settings page

The I/O Settings page provides a way to set the input audio gain and attenuation and the output volume. Access the I/O Settings page (figure 6-14) by clicking the **I/O Settings** link on the Control page.

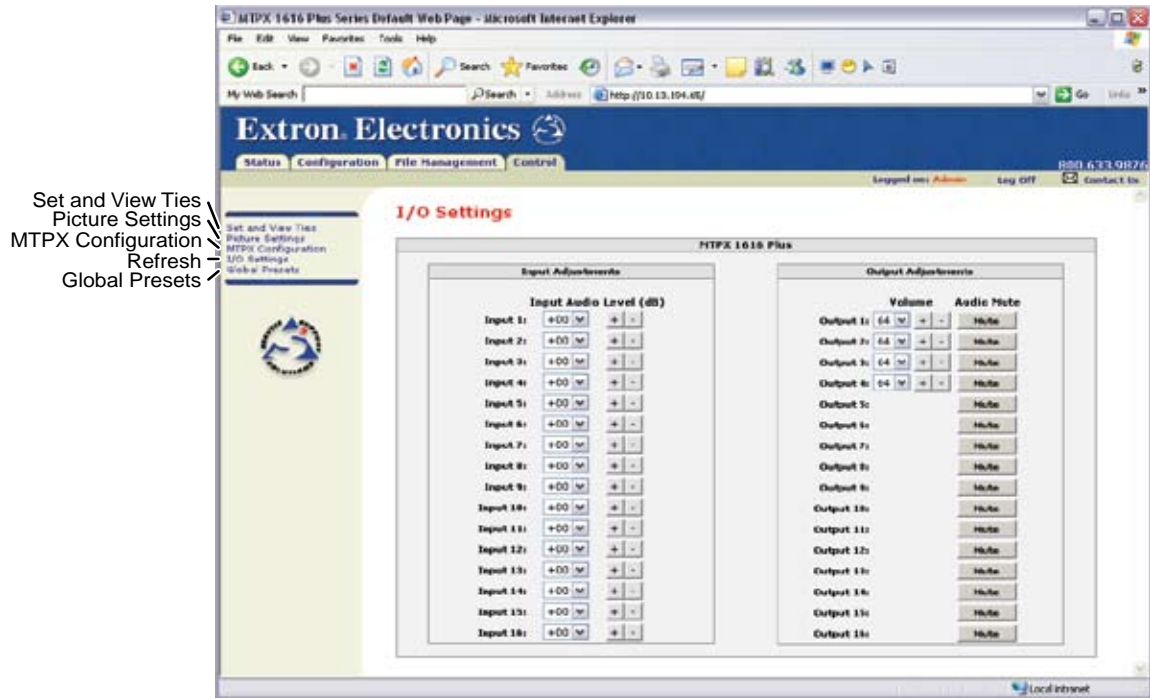


Figure 6-14 — I/O Settings page

HTML Operation, cont'd

Changing the input gain and attenuation



Users can set each input's level of audio gain or attenuation (-18 dB to +24 dB) from the I/O Settings page. Audio levels can be adjusted so there are no noticeable volume differences between sources.



Change an input's gain and attenuation setting as follows:

1. Click the desired input's Input Audio Level drop box. A drop-down scroll box appears (figure 6-15).

Input	Audio Level (dB)	+	-
Input 1:	+00		
Input 2:	+11		
	+10		
Input 3:	+09		
	+08		
Input 4:	+07		
	+06		
Input 5:	+05		
	+04		
Input 6:	+03		
	+02		
Input 7:	+01		
	+00		
Input 8:	-01		
	-02		
Input 9:	-03		
	-04		
Input 10:	-05		
	-06		
Input 11:	-07		
	-08		
Input 12:	-09		
	-10		
Input 13:	-11		
	-12		
Input 14:	-13		
	-14		
Input 15:	-15		
	-16		
Input 16:	-17		
	-18		

Figure 6-15 — Input Audio Level drop box

2. Click and drag the slider or click on the scroll up  button or the scroll down  button until the desired value is visible.

NOTE As an alternative to steps 1 and 2, or to listen to the audio as you make adjustments, click on the up  button or down  button.

Changing the output volume level

Users can set each local audio output's volume level through a range of zero steps of attenuation (full attenuation, minimum volume) to 64 steps of attenuation (no attenuation, full volume) from the I/O Settings page.

Change an output's audio volume setting as follows:

1. Click the desired output's Volume drop box. A drop-down scroll box appears (figure 6-16).

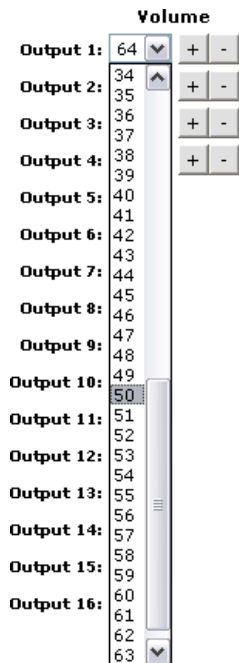






Figure 6-16 — Volume drop box

2. Click and drag the slider or click on the scroll up  button or the scroll down  button until the desired value is visible.

NOTE As an alternative to steps 1 and 2, or to listen to the audio as you make adjustments, click on the up  button or down  button.

NOTE The table on the next page defines the value of each audio volume step.

Muting and unmuting an audio or RS-232 output

Mute and unmute an audio or RS-232 output by clicking the associated Audio Mute button. Each click toggles the mute status.



HTML Operation, cont'd

Audio volume adjustment settings

Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume
00	76	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

Global Presets page

You can save and recall global presets from the Global presets page (figure 6-17). Access the Global presets page by clicking the **Global Presets** link on the left of the Control page.

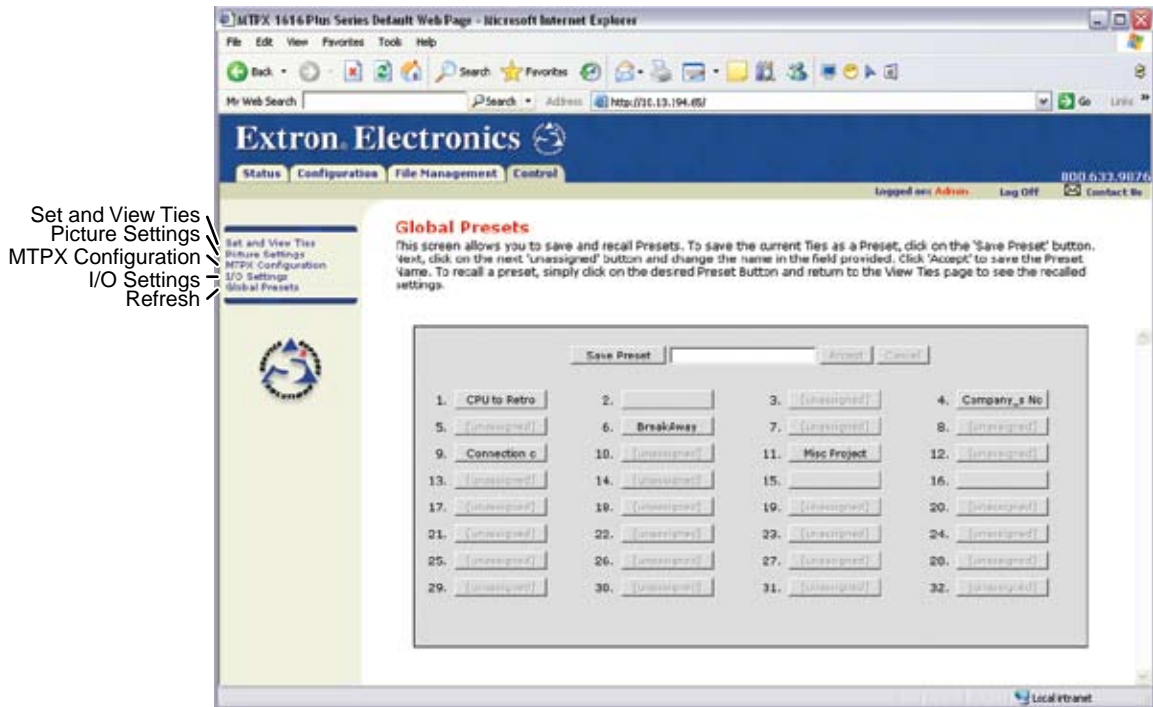


Figure 6-17 — Global Presets page

Saving a preset

Save the current configuration (configuration 0) as a preset as follows:

1. Click the **Save Preset** button.
2. Select the desired preset by clicking on one of the presets listed. To create a new preset, click one of the **[unassigned]** buttons. Overwrite an existing preset by clicking an already existing preset.
3. If desired, type over the current name in the box adjacent to the **Save Preset** button.

NOTE Preset names are limited to 12 upper and lower case alphanumeric characters and the {space} _ and / characters.

NOTE The following characters are invalid in preset names:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.

If you do not rename an unassigned button, the MTPX Plus switcher names the preset as Preset {next available number}.

If you do not rename an existing preset when it is overwritten, the MTPX Plus switcher retains the same name.

4. Click the **Accept** button.

Recalling a preset

To recall a global preset to be the current configuration, click the button associated with the desired preset.

HTML Operation, cont'd

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:) | \ and ?.



MTPX Plus Twisted Pair Matrix Switchers

Appendix A

Ethernet Connection

Ethernet Link

Subnetting — A Primer

Ethernet Connection

Ethernet Link

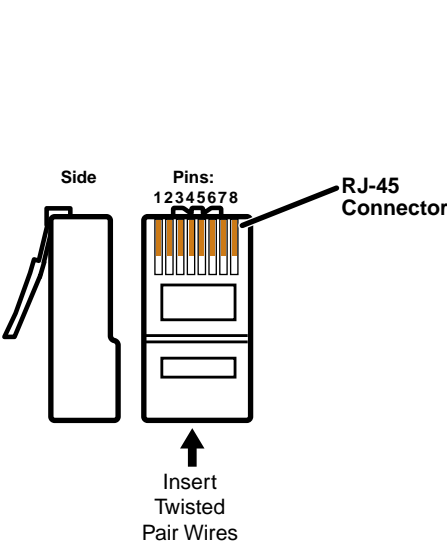
The rear panel Ethernet connector on the MTPX Plus switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.



Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure A-1).

- **Crossover cable** — Direct connection between the computer and the MTPX Plus switcher.
- **Patch (straight-through) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN.



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure A-1 — RJ-45 connector pinout tables

Default address

To access the MTPX Plus switcher via the LAN port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the MTPX Plus switcher.

Pinging to determine the Extron IP address

The Microsoft® Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and the MTPX Plus switcher. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click **Start > Run**.
2. At the Open prompt, type **command**.
3. Click the **OK** button.
4. At the DOS prompt, type `ping {IP address}` and then press [Enter]. The computer returns a display similar to figure A-2.

The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure A-2 — Ping response

Pinging to determine the Web IP address

The Ping utility has a modifier, *-a*, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, type `ping -a {IP address}` and then press [Enter]. The computer's return display is similar to the Ping response shown in figure A-2, except that when you specify the *-a* modifier, the line **Pinging mail...** reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Connecting as a Telnet client

The Microsoft Telnet utility is available from the DOS prompt. Telnet allows you to input SIS commands to the MTPX Plus switcher from the PC via the Ethernet link and the LAN.

Access the DOS prompt and start Telnet as follows:

1. On the Windows task bar, click **Start > Run**.
2. At the Open prompt, type *command*.
3. Click the **OK** button.
4. At the DOS prompt, type `telnet` and then press [Enter]. The computer returns a display similar to figure A-3.

Ethernet Connection, cont'd

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure A-3 — Telnet screen

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet. However, some basic level of understanding is necessary for operating the MTPX Plus switcher via Telnet.

Open

Connect to the MTPX Plus switcher using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 link.

Connect to the MTPX Plus switcher as follows:

1. At the Telnet prompt, type `open {IP address}` and then press [Enter].
If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to the MTPX Plus switcher.
If the switcher is password protected, Telnet displays the password prompt.
2. If necessary, at the password prompt, type `{password}` and then press [Enter].

Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all MTPX Plus switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set audio or RS-232 mutes, select a blue screen, and view all settings with the exception of passwords. By default, the MTPX Plus switcher ships with both passwords set to {carriage return}.

Once you are logged in, the switcher returns either **Login Administrator** or **Login User**. No further prompts are displayed until you break or disconnect the connection to the MTPX Plus switcher.

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character is 'Ctrl+']**. Many SIS commands include the keyboard **[Esc]** key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the **[Ctrl]** key and the **[]** key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to the MTPX Plus switcher intact.

The Escape key is the **[Esc]** key on the computer keyboard.

Local echo

Once connected to the MTPX Plus switcher, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type `set local_echo` and then press [Enter] before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's responses are displayed on the same line. For example: `1*1!In1 Out1 All`, where `1*1!` is the SIS command and `In1 Out1 All` is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as `a*d*m*i*n*`, where `admin` is the keyed in password and `*****` is the masked response.

You can turn off local echo by typing `unset local_echo` and then pressing [Enter] at the Telnet prompt. If you are connected to the MTPX Plus switcher and need to access the Telnet prompt to turn local echo off, type the Escape character (`Ctrl+J`).

Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the `Enter` key. This is the correct setting for SIS communication with the switcher. The Telnet `set crlf` command forces Telnet to transmit carriage return and line feed characters when `Enter` is pressed, but if `crlf` is set, the SIS link with the switcher does not function properly.

Close

To close the link to the switcher, access the Telnet prompt by typing the Escape character (`Ctrl+J`). At the Telnet prompt, type `close` and then press [Enter].

Help

For Telnet command definitions, at the Telnet prompt, type `?` and then press [Enter].

Quit

Exit the Telnet utility by typing `quit` and then pressing [Enter] at the Telnet prompt. If you are connected to the MTPX Plus switcher, access the Telnet prompt by typing the Escape character (`Ctrl+J`).

Ethernet Connection, cont'd

Subnetting — A Primer

It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a **subset** of a **network** — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the MTPX Plus switcher and the mail server gateway. To understand subnetting at the level required to install and operate the MTPX Plus switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The MTPX Plus switcher can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this manual, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in the MTPX Plus switcher (see “IP Settings/Options window” in chapter 5, “Matrix Software”, and “Email Settings page” in chapter 6, “HTML Operation”). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods) (figure A-4). Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: 192,168,254,254
Octets

Figure A-4 — IP address and octets

Subnet masks and octets

The subnet mask (figure A-5) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

255 indicates that this octet will be compared between two IP addresses. 0 indicates that this octet will **not** be compared between two IP addresses.

Typical Subnet Mask: 255,255,0,0
Octets

Figure A-5 — Subnet mask and octets

Determining whether devices are on the same subnet

To determine the subnet, the local device's IP address is **compared** to the remote device's IP address (figure A-6). Each address's octets are **compared** or **not compared**, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device's address and the remote device's IP address are unmasked.

Unmasked octets are compared (indicated by ? in figure A-6).

- If the subnet mask octet contains the value 0, the related octets of the local device's and remote device's IP addresses are masked.

Masked octets are not compared (indicated by X in figure A-6).

If the unmasked octets of the two IP addresses **match** (indicated by = in figure A-6) (example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by ≠ in figure A-6) (example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (? ? .X.X)	255.255.0.0 (? ? .X.X)	255.255.0.0 (? ? .X.X)
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	=,=.X.X — Match (Same subnet)	≠,≠.X.X — No match (Different subnet)	=,≠.X.X — No match (Different subnet)

Figure A-6 — Comparing the IP addresses

Ethernet Connection, cont'd



MTPX Plus Twisted Pair Matrix Switchers

Appendix B

Reference Information

Specifications

Part Numbers and Accessories

Button Labels

Reference Information

Specifications

Video

Routing

MTPX Plus 816.....	8 x 16 matrix, 3 x 1 local
MTPX Plus 168.....	16 x 8 matrix, 3 x 1 local
MTPX Plus 1616.....	16 x 16 matrix, 3 x 1 local
MTPX Plus 1632.....	16 x 32 matrix, 6 x 2 local
MTPX Plus 3216.....	32 x 16 matrix, 6 x 2 local
MTPX Plus 3232.....	32 x 32 matrix, 6 x 2 local

Gain Unity

Crosstalk

816, 168, 1616 models.....	-80 dB @ 1 MHz, -55 dB @ 10 MHz, -45 dB @ 30 MHz, -37 dB @ 100 MHz
1632, 3216, 3232 models....	-69 dB @ 1 MHz, -48 dB @ 10 MHz, -39 dB @ 30 MHz, -32dB @ 100 MHz

Switching speed 200 ms (max.)

Video input— local

Number/signal type.....	3 or 6 analog RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level), S-video, composite video
Connectors	3 or 6 female 15-pin HD
Nominal level	0.7 Vp-p for RGB
Minimum/maximum levels.....	0.3 V to 1.45 Vp-p with no offset at unity gain
Impedance.....	75 ohms
Horizontal frequency.....	15 kHz to 130 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss.....	<-30 dB @ 5 MHz
DC offset (max. allowable).....	250 mV

Video input — main(see transmitters' output specifications)

Number/signal type.....	8, 16, or 32 proprietary analog signals
Connectors	8, 16, or 32 (depending on configuration) female RJ-45 connectors

Video output— local

Number/signal type.....	1 or 2 analog RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video
Connectors	1 or 2 female 15-pin HD
Nominal level	0.7 Vp-p for RGB
Impedance.....	75 ohms
Return loss.....	<-30 dB @ 5 MHz
DC offset.....	<±20 mV with input at 0 offset

Video output — main(see receivers' input specifications)

Number/signal type.....	8, 16, or 32 proprietary analog signals
Connectors	8, 16, or 32 (depending on configuration) female RJ-45 connectors

Sync— local inputs and outputs only

Input type.....	RGBHV, RGBS, RGsB, RsGsBs
Output type.....	See receiver specifications (see specifications on Web site).
Input level	3.5 V to 5.5 Vp-p, unterminated; 4.0 V to 5.0 Vp-p normal
Output level	See receiver specifications (see specifications on Web site).
Input impedance	573 ohms ± 5%

Output impedance	110 ohms
Max. input voltage	5.0 Vp-p
Max. propagation delay	60 ns total
Max. rise/fall time	4 ns
Polarity.....	Positive or negative

Audio

Routing

MTPX Plus 816.....	8 x 16 mono matrix, 3 x 4 local
MTPX Plus 168.....	16 x 8 mono matrix, 3 x 4 local
MTPX Plus 1616.....	16 x 16 mono matrix, 3 x 4 local
MTPX Plus 1632.....	16 x 32 mono matrix, 6 x 8 local
MTPX Plus 3216.....	32 x 16 mono matrix, 6 x 8 local
MTPX Plus 3232.....	32 x 32 mono matrix, 6 x 8 local
Gain (local inputs and outputs) ..	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response	20 Hz to 20 kHz, ± 1 dB
THD + Noise	0.15% @ 1 kHz at nominal level
S/N.....	>70 dB at maximum output (unweighted)
CMRR.....	>43 dB @ 20 Hz to 20 kHz

Audio input— local

Number/signal type.....	3 or 6 stereo, balanced/unbalanced
Connectors	(3) or (6) 3.5 mm captive screw connectors, 5 pole
Impedance	>10k ohms unbalanced
Nominal level	+4 dBu (1.23 Vrms), -10 dBV (316 mVrms)
Maximum level.....	+18 dBu, (unbalanced) at 1% THD+N

NOTE $0 \text{ dBu} = 0.775 \text{ Vrms}$, $0 \text{ dBV} = 1 \text{ Vrms}$, $0 \text{ dBV} \approx 2 \text{ dBu}$

Audio input — main(see transmitters' output specifications)

Number/signal type.....	8, 16, or 32 proprietary analog signals
Connectors	8, 16, or 32 (depending on configuration) female RJ-45 connectors

Audio output— local

Number/signal type.....	4 or 8 dual mono, balanced/unbalanced
Connectors	(4) or (8) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	± 1 dB channel to channel
Maximum level (Hi-Z)	+18 dBu, balanced or unbalanced at 1% THD+N
Maximum level (600 ohm)	+15 dBm, balanced or unbalanced at 1% THD+N

Audio output — main(see receivers' input specifications)

Number/signal type.....	8, 16, or 32 proprietary analog signals
Connectors	8, 16, or 32 (depending on configuration) female RJ-45 connectors

Control/remote — switcher host control

Serial host control ports	1 RS-232 or RS-422, rear panel 9-pin female D connector 1 RS-232 front panel 2.5 mm mini stereo jack
Baud rate and protocol.....	9600 baud (default), 19200, 38400, and 115200 (adjustable); 8 data bits; 1 stop bit; no parity

Reference Information, cont'd

Serial control pin configurations

9-pin female D connector	RS-232: 2 = TX, 3 = RX, 5 = GND RS-422: 2 = TX-, 3 = RX-, 5 = GND, 7 = RX+, 8 = TX+
Mini stereo jack	Tip = TX, ring = RX, sleeve = GND
Ethernet control port	1 RJ-45 female connector
Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Ethernet protocol	ARP, DHCP, ICMP (ping), TCP/IP, UDP, Telnet, HTTP, SMTP
Default settings	Link speed and duplex level = autodetected IP address = 192.168.254.254, Subnet mask = 255.255.0.0, Gateway = 0.0.0.0, DHCP = off
Web server	Up to 200 simultaneous sessions 16 MB nonvolatile user memory
Program control	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer version 6 or higher, Telnet

Control/remote — external device(pass-through, unidirectional, or bidirectional)

Serial control ports	RS-232, 3.5 mm captive screw connectors, 3 pole
3232 and 1632 models	16 connectors
3216, 1616, and 816 models	8 connectors
168 models	4 connectors
Baud rate and protocol	Up to 38400 baud, 9600 baud (default); 5-8 data bits; 1 or 2 stop bits; odd, even, or no parity; XON, XOFF, or no flow control

NOTE Protocol is mirrored between the switcher and the receiver.

Serial control pin configurations. 1 = TX, 2 = RX, 3 = GND

General

Recommended cable type	CAT 5/5E/6/7 (shielded or unshielded)
Power	100 VAC to 240 VAC, 50/60 Hz, internal
1632, 3216, 3232 models	220 watts
816, 168, 1616 models	120 watts
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Fan, left to right (as viewed from the front panel)
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	
1632, 3216, 3232 models	5.25" H x 17.0" W x 9.4" D (3U high, full rack wide) (13.3 cm H x 43.1 cm W x 23.9 cm D) (Depth excludes connectors. Width excludes rack ears.)
816, 168, 1616 models	3.5" H x 17.0" W x 9.4" D (2U high, full rack wide) 8.9 cm H x 43.1 cm W x 23.9 cm D (Depth excludes connectors. Width excludes rack ears.)
Product weight	
1632, 3216, 3232 models	16 lbs (7.3 kg)
816, 168, 1616 models	8.5 lbs (3.9 kg)
Shipping weight	
1632, 3216, 3232 models	26 lbs (11.8 kg)
816, 168, 1616 models	18 lbs (9 kg)

DIM weight (International)
 1632, 3216, 3232 models.... 26 lbs (11.8 kg)
 816, 168, 1616 models..... 18 lbs (9 kg)
 Vibration..... ISTA 1A in carton (International Safe Transit Association)
 Regulatory compliance
 Safety..... CE, C-tick, CUL, UL
 EMI/EMC CE, C-tick, FCC Class A, ICES, VCCI
 Environmental Complies with the appropriate requirements of WEEE.
 MTBF..... 30,000 hours
 Warranty 3 years parts and labor

NOTE All nominal levels are at $\pm 10\%$.

NOTE Specifications are subject to change without notice.

Part Numbers and Accessories

MTPX Plus matrix switcher part numbers

Matrix switcher part numbers	Part number
MTPX Plus 816	60-834-01
MTPX Plus 168	60-833-01
MTPX Plus 1616	60-832-01
MTPX Plus 1632	60-898-01
MTPX Plus 3216	60-899-01
MTPX Plus 3232	60-897-01

Included parts

These items are included in each order for a MTPX Plus matrix switcher:

Included parts	Replacement part number
Tweezer (small screwdriver)	
<i>MTPX Plus User's Manual</i>	
5-pole captive screw audio connectors (7 or 14, depending on the model)	
3-pole captive screw connectors (8 or 16, depending on the model)	
Extron Software Products CD (Matrix Switchers Control Program and Button-Label Generator)	

Reference Information, cont'd

Accessories

These items can be ordered separately:

Adapters, power supplies, labels	Part number
MKP 2000 matrix switcher X-Y remote control panel	
Black	60-682-02
White	60-682-03
RAL9010 white	60-682-05
MKP 3000	
Black	60-708-02
White	60-708-03
RAL9010 white	60-708-05

Cables

NOTE Enhanced Skew-Free™ A/V UTP cables are not recommended for Ethernet/LAN applications.

Enhanced Skew-Free™ A/V cable	Part number
Enhanced Skew-Free A/V cable (cut, various lengths)	26-569-xx
Enhanced Skew-Free A/V 1000' (Bulk) (non-plenum)	22-141-03
Plenum enhanced Skew-Free A/V 1000' (Bulk)	22-142-03

Male-to-female VGA molded connector cables	Part number
VGA M-F MD/3, 3' (0.9 m)	26-112-17
VGA M-F MD/6, 6' (1.8 m)	26-112-15
VGA M-F MD/15, 15' (4.5 m)	26-112-01
VGA M-F MD/25, 25' (7.6 m)	26-112-05
VGA M-F MD/35, 35' (10.6 m)	26-112-28
VGA M-F MD/50, 50' (15.2 m)	26-112-29
VGA M-F MD/75, 75' (22.8 m)	26-112-30
VGA M-F MD/100, 100' (30.4 m)	26-112-31

Male-to-female VGA backshell connector cables	Part number
VGA M-F BK/3, 3' (0.9 m)	26-112-35
VGA M-F BK/6, 6' (1.8 m)	26-112-36
VGA M-F BK/15, 15' (4.5 m)	26-112-37
VGA M-F BK/25, 25' (7.6 m)	26-112-38
VGA M-F BK/35, 35' (10.6 m)	26-112-27
VGA M-F BK/50, 50' (15.2 m)	26-112-02
VGA M-F BK/75, 75' (22.8 m)	26-112-03
VGA M-F BK/100, 100' (30.4 m)	26-112-04

Male-to-male VGA molded connector cables	Part number
VGA M-M MD/3, 3' (0.9 m)	26-238-14
VGA M-M MD/6, 6' (1.8 m)	26-238-01
VGA M-M MD/10, 10' (3.0 m)	26-238-07
VGA M-M MD/15, 15' (4.5 m)	26-238-02
VGA M-M MD/25, 25' (7.6 m)	26-238-03
VGA M-M MD/35, 35' (10.6 m)	26-238-17
VGA M-M MD/50, 50' (15.2 m)	26-238-18
VGA M-M MD/75, 75' (22.8 m)	26-238-19
VGA M-M MD/100, 100' (30.4 m)	26-238-20

Male-to-male VGA molded connector cables	Part number
VGA M-M BK/3, 3' (0.9 m)	26-238-24
VGA M-M BK/6, 6' (1.8 m)	26-238-25
VGA M-M BK/10, 10' (3.0 m)	26-238-26
VGA M-M BK/15, 15' (4.5 m)	26-238-27
VGA M-M BK/25, 25' (7.6 m)	26-238-28
VGA M-M BK/35, 35' (10.6 m)	26-238-16
VGA M-M BK/50, 50' (15.2 m)	26-238-04
VGA M-M BK/75, 75' (22.8 m)	26-238-05
VGA M-M BK/100, 100' (30.4 m)	26-238-06

Connectors

Connector	Part number
CAT 6 jack (black), qty. 10	100-476-01
CAT 6 jack (red), qty. 10	100-477-01
CAT 6 jack (blue), qty. 10	100-478-01
CAT 6 jack (orange), qty. 10	100-479-01
CAT 6 jack (gray), qty. 10	100-480-01
CAT 6 jack (white), qty. 10	100-481-01
CAT 6 jack (ivory), qty. 10	100-482-01

Button Labels

Page B-9 provides strips of blank button labels. If desired, copy them or cut them out, write button information in each button area as desired, and put them in the switcher's input or output buttons' windows. You can also create labels using the Button-Label Generator software (see chapter 5, "Matrix Software").

Installing labels in the matrix switcher's buttons

Install new labels in the matrix switcher's front panel buttons as follows:

1. Make new labels using either the blanks on page B-9 or the Button-Label Generator software. Cut them out.

NOTE For best results, print on transparent or translucent material.

2. Remove the button from the MTPX: use a small, flat bladed screwdriver such as an Extron Tweeker to gently pry a button out from the front panel (figure B-1).

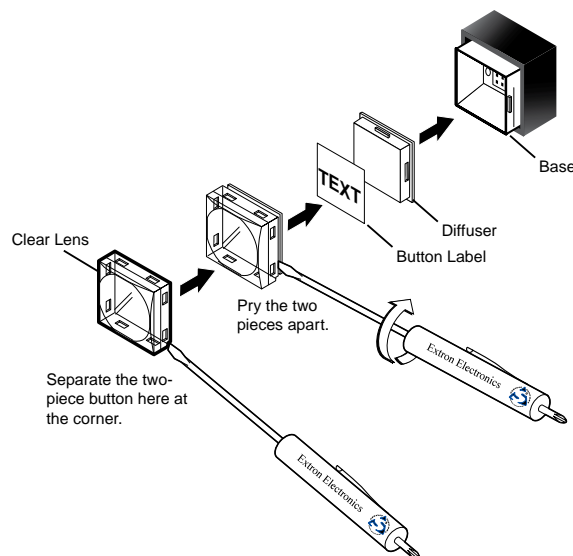
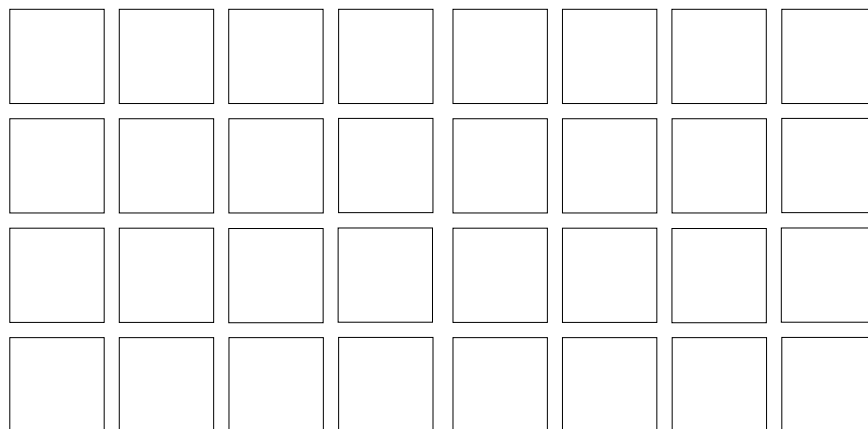
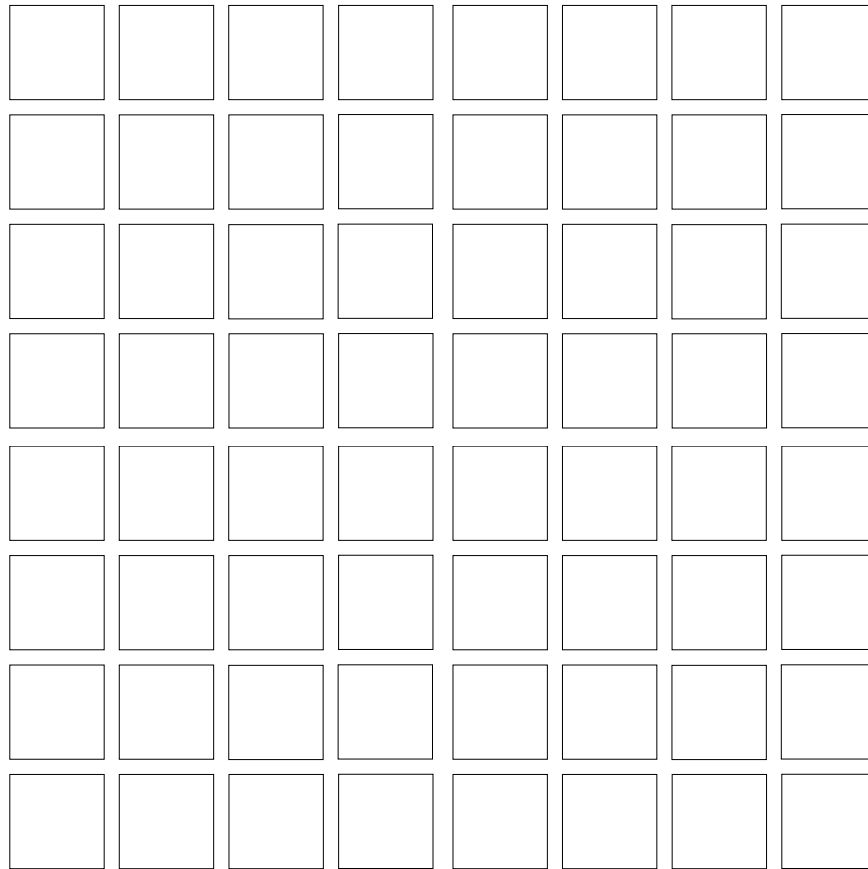
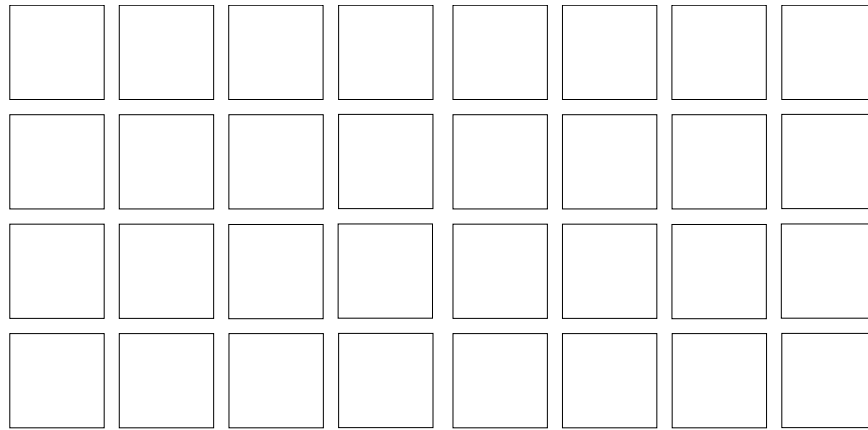


Figure B-1 — Illuminated button label replacement

3. Locate the notch in the corner of one side of the clear button cap lens.
4. Separate the white backing (diffuser) from the clear button cap (lens): insert the blade of the small screwdriver into the corner notch and gently twist the blade.
5. Save the translucent, white diffuser, but remove the text/label insert from the transparent button cap lens.
6. Insert the replacement button label into the button cap. Check for correct label orientation.
7. Align the white diffuser plate with the cap (lens). The bumps on the diffuser plate should be aligned (top and bottom) with the notches on the clear button cap. Firmly snap it into place.
8. Align the tabs on the MTPX's plunger with the notches on the diffuser plate. Gently, but firmly, press the reassembled button into place in the switcher's front panel.
9. Repeat steps 2 through 8 as needed to relabel other buttons.



Button label blanks, 16-button strips

Reference Information, cont'd

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Asia:

Extron Electronics, Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Japan:

Extron Electronics, Japan
Kyodo Building
16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron USA - West Headquarters +800.633.9876 Inside USA / Canada Only +1.714.491.1500 +1.714.491.1517 FAX	Extron USA - East +800.633.9876 Inside USA / Canada Only +1.919.863.1794 +1.919.863.1797 FAX	Extron EMEA +800.3987.6673 Inside Europe Only +31.33.453.4040 +31.33.453.4050 FAX	Extron Asia +800.7339.8766 Inside Asia Only +65.6383.4400 +65.6383.4664 FAX	Extron Japan +81.3.3511.7655 +81.3.3511.7656 FAX	Extron China +400.883.1568 Inside China Only +86.21.3760.1568 +86.21.3760.1566 FAX	Extron Middle East +971.4.2991800 +971.4.2991880 FAX
--	--	---	---	---	--	---